**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of

Applicants: Bednorz et al.

Serial No.: 08/479,810

Filed: June 7, 1995

Appeal No. 2009-003320

Date: Jan. 1, 2010

Docket: YO9198707 4US5

Group Art Unit: 1751

Examiner: M. Kopec

For: NEW SUPERCONDUCTIVE COMPOUNDS HAVING HIGH TRANSITION TEMPERATURE, METHODS FOR THEIR USE AND PREPARATION

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**SUBSTITUTE**
**REQUEST FOR REHEQRING**
**UNDER**
**37 C.F.R. § 41.52 (a)(l)**
**Of**
**Decision on Appeal dated 09/17/2009**

Sir: Please consider the following.

Pursuant to 37 C.F.R. § 41.51 (a)(1) appellants request rehearing of the Decision on Appeal dated 09/17/2009 (Board's Decision).

NOTE

Appellants request that this Substitute Request for Rehearing be considered in substitute for the Request for Rehearing submitted Nov. 19, 2009. This Substitute Request corrects typographical errors and language errors in Request for Rehearing submitted Nov. 19, 2009.

Appellants request that this Substitute Request for Rehearing be considered with the following supplements to the Request for Rehearing:

- Supplement 1 submitted on 12/10/2009,
- Supplement 2 submitted on 12/18/2009, and
- Supplement 3 submitted on 01/01/2010 .

## LIST OF ACRONYMS AND ABBREVIATIONS USED IN THIS PAPER

The Following acronyms or abbreviated names are used in this paper:

1. **BD** or **Board's Decision** for the Decision on Appeal dated 09/17/2009;
2. **FA** or **Final Action** for the final rejection in the Office Action dated 10/20/2005 which is the final rejection which is being appealed;
3. **OA07282004** for the Office Action dated 07/28/2004.
4. **TFA** or **Total Final Action** for the combination of the Final Action and OA07282004 which is incorporated in the Final Action at page 4.
5. **BV1** for Appellants Brief Volume 1 filed May 15, 2008;
6. **BV2** for Appellants Brief Volume 2 filed May 15, 2008;
7. **BV3** for Appellants Brief Volume 3 filed May 15, 2008;
8. **BV4** for Appellants Brief Volume 4 filed May 15, 2008;
9. **BV5** for Appellants Brief Volume 5 filed May 15, 2008;
10. **APPELLANT'S BRIEF** for BV1, BV2, BV3, BV4 and BV5 collectively.
11. **EA** or **Examiner's Answer** for the Examiner's Answer mailed August 20, 2008;
12. **RB** for the Reply Brief filed 20 October 2008;
13. **RB1** for the Reply Brief Supplement 1 filed October 21, 2008;
14. **RB2** for the Reply Brief Supplement 2 filed October 28, 2008;
15. **RB3** for the Reply Brief Supplement 3 filed November 6, 2008,
16. **AR** or **Appellants' Replies** for RB, RB1, RB2 and RB3 collectively,; and
17. **TOH** for the Transcript of the Oral Hearing held 10 June 2009.

## INITIAL COMMENTS

The Board's Decision page 30, lines 8-10 states "the claims under review are not limited to ceramic compositions (i.e., compositions which can be made using known principles of ceramic fabrication). Appellants respectfully disagree. The following claims recite that the high $T_C$ element of the claims from which these claims depend "can be made according to known principles of ceramic science" or similar recitation: dependent claims 322 to 360, 414 to 427, 436, 453 to 465, 473 to 475, and 484 to 491 and independent claim 522. Of these claims the following are allowed by the Examiner: 330, 335, 336, 346 and 358. Most of the dependent claims are in multiple dependent form. The Board's Decisions reversed the Examiner's rejection of parts of the other multiple dependent claims. Others remain with the Examiner's rejections not reversed.

In addition,

- independent claims 59 is directed to "**a ceramic like material**" and

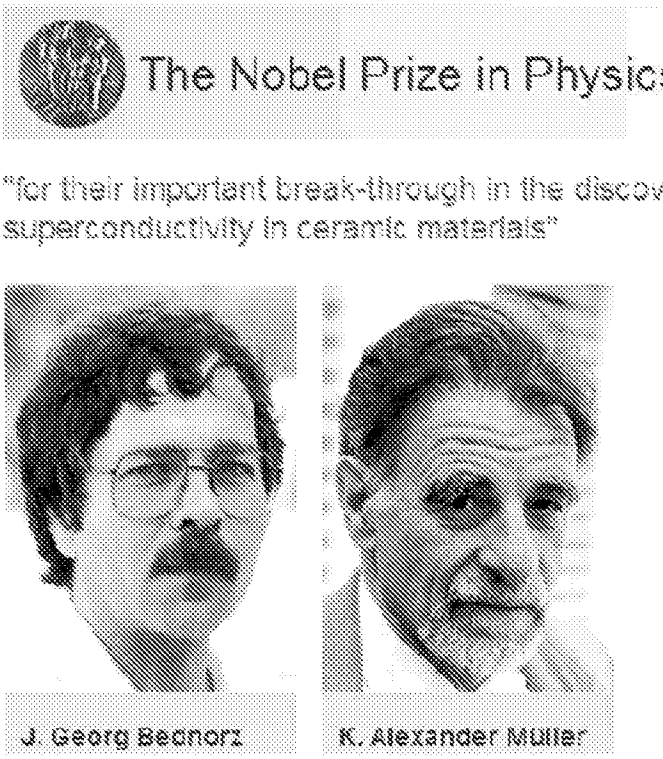
- independent claim 374 is directed to "**a material comprising a ceramic characteristic.**".

Dependent claim 351 depends from claim 59 and states that the **"ceramic like material" "can be made according to known principles of ceramic science."**

Dependent claim 419 depends from claim 374 and states that the "**the material comprising a ceramic characteristic**" "**can be made according to known principles of ceramic science.**"

Some of these claims are listed below.

Appellants note that at this web address of the Nobel Prize website http://nobelprize.org/nobel_prizes/physics/laureates/1987/ the following announcement of Appellants' award of the 1987 Nobel Prize can be found.




This states that the 1987 Nobel Prize was awarded to Appellants "for their important break-through in the discovery of superconductivity in ceramic materials." The Board's Decision does not find enabled a claim commensurate in scope with the contribution for which they were awarded the Nobel Prize.

CLAIM 59 A combination, comprised of:

**a ceramic-like material** having an onset of superconductivity at an onset temperature greater than or equal to 26°K,

means for passing a superconducting electrical current through said ceramic-like material while said material is maintained at a temperature greater than or equal to 26°K and less than said onset temperature, and

means for cooling said superconducting ceramic-like material to a superconductive state at a temperature greater than or equal to 26°K and less than said onset temperature, said material being superconductive at temperatures below said onset temperature and a ceramic at temperatures above said onset temperature.

CLAIM 351 A **combination according to claim 59, wherein said ceramic-like material can be made according to known principles of ceramic science.**

♦

CLAIM 374 A combination, comprised of:

**a material comprising a ceramic characteristic** comprising an onset of superconductivity at an onset temperature greater than or equal to 26°K,

means for passing a superconducting electrical current through said material comprising a ceramic characteristic while said material is maintained at a temperature greater than or equal to 26°K and less than said onset temperature, and

means for cooling said superconducting material having a ceramic characteristic to a superconductive state at a temperature greater than or equal to 26°K and less than said onset temperature, said material being superconductive at temperatures below said onset temperature and a ceramic at temperatures above said onset temperature.

CLAIM 419 A combination according to claim 374, wherein **said material can be made by known principles of ceramic science.**

♦

CLAIM 522 An apparatus comprising:

a superconductive current carrying element comprising a $T_c$ greater than or equal to 26 °K

**said superconductive current carrying element comprises a composition that can be made according to known principles of ceramic science**.

♦

CLAIM 438 An apparatus comprising: a means for conducting a superconducting current at a temperature greater than or equal to 26°K and a means for providing an electric current to flow in said means for conducting a superconducting current.

CLAIM 453 An apparatus according to anyone of claims **438**, 439 or 440, **wherein said means for conducting a superconducting current can be made according to known principles of ceramic science.**

- **List of multiple-dependent claims reciting limitation** "made according to known principles of ceramic science"

**Underlined Referenced Claim Numbers = allowed by the Examiner**

**Double Underlined Referenced Claim Numbers = Examiner's rejection reversed by the Board's Decision**

**Referenced Claim numbers not underlined or double underlined remain rejected.**

CLAIM 326 An apparatus according to anyone of claims 93 to 95 or 138, wherein said mixed copper oxide can be made according to known principles of ceramic science.

CLAIM 327 (Previously Presented) A combination according to anyone of claims 64 or 135, wherein said mixed copper oxide can be made according to known principles of ceramic science.

CLAIM 329 A superconductive combination according to anyone of claims 12 to 23, 110, 131, 132 or 367-370, wherein said superconductive composition can be made according to known principles of ceramic science.

CLAIM 334 An apparatus according to anyone of claims 275, 276, 310 or 311, wherein said superconductive copper oxide can be made according to known principles of ceramic science.

CLAIM 337 A device according to anyone of claims 114 or 117, wherein said transition metal oxide can be made according to known principles of ceramic science.

CLAIM 338 An apparatus according to anyone of claims 24 to 26, 60 to 63, 116, 141 to 143, 172, 187, 222, 232 to 234, 263, 278, 285, 287, 288, 313 or 320, wherein said transition metal oxide can be made according to known principles of ceramic science.

CLAIM 355 (A combination according to anyone of claims 77, 78, 79, 80, 81, 186, 379 or 380, wherein said mixed copper oxide composition can be made according to known principles of ceramic science.

CLAIM 356 A device according to anyone of claims 124, 125, 126, or 127, wherein said composition of matter can be made according to known principles of ceramic science.

CLAIM 422 A combination according to anyone of claims 379 or 380, wherein said mixed copper oxide can be made by known principles of ceramic science.

CLAIM 424 A superconductive apparatus according to anyone of claims 383, 384, 385, 386, 387 and 389, wherein said composition can be made by known principles of ceramic science.

CLAIM 427 A apparatus according to anyone of claims 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412 or 413, wherein said superconductive composition can be made by known principles of ceramic science.

CLAIM 549 An apparatus according to anyone of claims 496 to 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514 or 515, wherein said superconductive element can be made according to known principles of ceramic science.

## ARGUMENT

### 1. SECTION

BD page 7 footnote 4 states

> Claims 138 and 326/138 are not included in the Examiner's rejection and therefore are not on appeal and are not under our jurisdiction. Nevertheless, we observe that these claims are not limited to the subject matter described as enabled in the Answer (or in this Opinion). Under these circumstances, the Examiner's failure to include claims 138 and 326/138 in the § 112, first paragraph, rejection before us appears to be an inadvertent oversight.

BD page 2 in footnote 1 acknowledges that claims 138 and 326/138 are not on appeal since they are not in the list or rejected claims in the Examiner's Answer.

Since claims 138 and 326/138 are not finally rejected and are not under appeal, these claims are not within the Board's jurisdiction. As stated in Appellant's Request to Reopen Prosecution, it is Appellants' understanding that the Board should not be making statements in the Board's Decision that cast doubt on the patentability or validity of claims that are not finally rejected and under appeal. In view thereof Appellants request that the Request to Reopen Prosecution be granted.

### 2. SECTION

Although BD states at pages 2-4 that

> Based on a discovery for which they won a Nobel prize, Appellants claim a combination, apparatus, device, or structure comprising a material exhibiting a superconductive state at a temperature greater than or equal to 26°K. This material is broadly and variously defined in the rejected claims as being, for example, an

> oxide, a composition, a ceramic characteristic, and a means.

The Board's Decision leaves out another very important limitation that is contained in many of Appellant's claims which is that the high $T_C$ superconducting element **"can be made according to known principles of ceramic science**" or similar recitation which can be found in dependent claims 322 to 360, 414 to 427, 436, 453 to 465, 473 to 475, and 484 to 491 and independent claim 522. (These claims shall be referred to herein as The Know Principles of Ceramic Science Claims.) Of these claims the following were allowed by the examiner: 330, 335, 336, 346 and 358 and the rejection was reversed by the Board's Decision for the following claims 407, 408, 509 and 510. See BV1 paragraph bridging pages 45-46, BV1 page 52, lines 1-4 from the bottom and BV1, page 225, the first sentence of the last paragraph which states:

> More specifically, Applicants see no justifiable reason to reject as not enabled Applicants' claims which specifically recite, or that can be amended to recite, that the element having a Tc ≥26K "can be made according to known principles of ceramic science" since there is no evidence that such species cannot be made following Applicants' teaching..

The Board's Decision states at page 3, lines 2-3:

> Rejected claims defining the above-described subject matter include claims 12, 88, 115, 117, 374, and 438 which read as follows: [the full text of claims 12, 88, 115, 117, 374, and 438 are quoted]

The Boards' Decision has selected to highlight, as examples claims 12, 88, 115, 117, 374, and 438 as broadly stated independent claims. Of these independent claims, claims 88 and 115 do have a claim depending from them reciting the limitation **"can be made according to known principles of ceramic science."** Claims 88, 117, 374 and 438 do have claims depending therefrom reciting **"can be made according to known**

**principles of ceramic science.**" Claim 239 depends from claim 12, Claim 337 depends from claim 115, Claim 419 depends from claim 374. Claim 453 depends from claim 438. Dependent claims 239, 337, 419 and 453 recite **"can be made according to known principles of ceramic science."**

BV1 at page 9 states:

> All rejected claims are appealed. Claims 1-64, 66-72, 84, 85, 88-96, 100-102, 109-112, 115-122, 126-134, 139, 141-143, 146-149, 153-155, 162-166, 182-184, 187, 188, 192-195, 198-212, 217-219, 222, 223, 227-230, 232-234, 237-240, 244-246, 253-257, 268, 273-275, 278, 279, 283-286, 289-295, 302, 303, 308-310, 313, 314, 318-329, 331-334, 337-345, 347-357, 359-374, 376, 382, 383, 389, 394, 395, 402, 407, 408, 414-419, 421-424, 426-501, 508-510 and 515-543. Each rejected claim is appealed individually. None of these claims are appealed in a group except as indicated in Preliminary Comment A in Volume 3.

BV3 at page 3 under heading Preliminary Comments A states"[a]ll the claims are individually appealed." BV3 pages 13-1769 provides reasons for why each rejected claims is enabled by Appellants' teaching and why the Examiner's reasons for rejecting those claims as not being enabled is legal error. The Board's Decision has not directly addressed those arguments.

## 3. SECTION

The Board's Decision states at page 6, line 10-14

> Appellants' basic position is that the Examiner has failed to make a prima facie case that the rejected claims are not enabled and in any event that Appellants have provided extensive evidence showing persons of ordinary skill in this art can determine species within the scope of the rejected claims without undue experimentation *(see,* for example

Although the statement is correct it is incomplete:

Appellants' position is more completely summarized at BV1 in the paragraph bridging pages 44-45 which states:

> Since the known methods disclosed by Applicants are used to fabricate species within the scope of Applicants claims, it is Applicants' position that persons of skill in the art can determine those species without undue experimentation and consequently, Applicants have enabled their claims to their full scope. When species are determinable without undue experimentation, the art is a predictable art. Even though a high Tc material is a chemical composition, all aspects of chemistry are not unpredictable. That chemistry is not per se unpredictable is generally recognized by decisions of the Board and the Courts, for example at 427 F.2d 833, 839 the CCPA in In re Fisher states "In cases involving unpredictable factors such as most chemical reactions." Thus all chemical reactions are [not] [sic]unpredictable [.] [sic] Applicants' evidence shows that the chemistry involved in formation of high Tc materials does not have to be understood to fabricate them which is one reason for why species are readily determinable. If the chemistry does not have to be understood to fabricate species, it is improper to refer to the art of high Tc super-conductivity as unpredictable. Applicants' claims are directed to an apparatus using the high Tc material and not to a composition of matter.

Appellants address the issue of the patent legal term "predictable versus non-predictable" meaning "determinable versus non-determinable" in many placed in Appellants' Brief and Appellants' Replies. Appellants support this based on legal authorities. See BV1 at page 47, lines 12-23 which states:

> In In re Wands 858 F.2d 731, 742 (Fed. Cir. 1988); 8 U.S.P.Q.2D 1400, 1408 Judge Newman concurring in part, dissenting in part stated "[The inventor] must provide sufficient data or authority to show that his results are reasonably predictable within the scope of the claimed generic invention, based on experiment and/or scientific theory." Thus experiment or theory is sufficient to establish predictability. And as stated above by the Examiner "a person of skill in the art, using the techniques described in the application, which included all principles of ceramic fabrication known at the time the application was initially filed, can make the known superconductive compositions." There is no requirement to know in advance all examples enabled by their teaching. Thus the field of High Tc superconductivity is predictable within the

meaning of In re Wands. Species within the scope of Applicants' claims are determinable without undue experimentation and by well known testing.

Thus "experiment and/or scientific theory" Is sufficient to establish enablement.

See BV1 paragraph bridging page 47-48 which states:

The Examiner's reference to "subsequently discovered BSCCO or Tl-systems " suggests that it is the Examiner's view that for Applicants to be allowed a generic claim, Applicants must know in advance all materials that can be used to practice Applicant's claims. The CAFC has stated in Sri Int'l v. Matsushita Elec. Corp., 775 F.2d 1107, 1121 (Fed. Cir. 1985); 227 USPQ 577, 586 that this is not necessary:

> The law does not require the impossible. Hence, it does not require that an applicant describe in his specification every conceivable and possible future embodiment of his invention. The law recognizes that patent specifications are written for those skilled in the art, and requires only that the inventor describe the "best mode" known at the time to him of making and using the invention. 35 U.S.C. § 112.

Applicants have shown that persons of ordinary skill in the art as of Applicants discovery can practice Applicants' claims to their full scope and it is Applicants' understanding of the Examiner's statements that the Examiner has agreed with this.

The CAFC has further stated:

> An applicant for patent is required to disclose the best mode then known to him for practicing his invention. 35 U.S.C. § 112. He is not required to predict all future developments which enable the practice of his invention in substantially the same way. Hughes Aircraft Co. v. United States, 717 F.2d 1351, 1362 (Fed. Cir. 1983);39 USPQ2d 1065.

This is exactly what applicants have done. Thus Applicants' claims are enabled.

The CAFC further states in regards to future developments:

> Enablement does not require the inventor to foresee every means of implementing an invention at pains of losing his patent franchise. Were it otherwise, claimed inventions would not include improved modes of practicing those inventions. Such narrow patent rights would rapidly become worthless as new modes of practicing the invention developed, and the inventor would lose the benefit of the patent bargain. Invitrogen Corp. v. Clontech Labs., Inc., 429 F.3d 1052, 1071 (Fed. Cir. 2005)" And, "Our case law is clear that an applicant is not required to describe in the specification every conceivable and possible future embodiment of his invention." Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1344, 60 U.S.P.Q.2D (BNA) 1851 (Fed. Cir. 2001).

The Examiner's position in regards to the enablement of Applicants' claims is inconsistent with the CAFC's position that "[e]nablement does not require the inventor to foresee every means of implementing an invention." Thus Applicants' claims are enabled and the rejection should be reversed. The Examiner uses the term predictable with the meaning of "foresee." The correct meaning of the term "predictable" for enablement purposes is "determinable" without undue experimentation.

Thus the patent legal term "predictable" does not means knowledge in advance of all species that cam with in the scope of Appellants' claims, but means determinable without undue experimentation. The Board's Decision ignores this legal authority and is thus an error of law.

BV1 paragraph bridging pages 51-52 states:

> The Board in Ex parte Jackson 217 USPQ 804 and 807 states "a considerable amount of experimentation is permissible if it is merely routine." As stated by the Examiner the experimentation to find other species is merely routine. The Board in Ex parte Jackson goes on to state if the experimentation is not merely routine there is enablement "if the specification in question provides

excessable amount of guidance with respect to the direction in which the experimentation should proceed to enable the determination of how to produce a desired embodiment of the invention claimed." 217 USPQ 804, 807. Thus guidance is needed when the experimentation is not merely routine. Since there is no evidence in the present application that anything other that routine experimentation is needed to determine other species, than specifically described by Applicants', the guidance provided by Applicants' teaching is sufficient to satisfy enablement.

Thus the Board's own precedent Ex parte Jackson states "a considerable amount of experimentation is permissible if it is merely routine."

BV1 paragraph bridging pages 87-88 states:

The CAFC in In re Wright 27 USPQ2d 1510 (1993) supports Applicants' view that a predictable art is one in which species within the scope of a claim under examination are determinable whether or not a theory of the invention is known as of the filing date of the application under examination. The claims under examination in In re Wright are directed to a recombinant vaccine which confers immunity to chickens against a certain type of RNA tumor virus. These claims include in their scope vaccines against the AIDS virus. The CAFC states:

> Wright seeks allowance, however, of claims which would provide, in varying degrees, a much broader scope of protection than the allowed claims. 27 USPQ2d 150, 1511.

The CAFC further states:

> The Examiner made reference to the difficulty that the scientific community is having in developing generally successful AIDS virus vaccines merely to illustrate that the art was not even today as predictable as Wright suggested it was back in 1983![ **In re Wright, 999 F.2d 1557 (Fed. Cir. 1993)**]

No mention is made of the presence or absence of a theory. Thus In re Wright shows that an art is unpredictable when

> persons of skill in the art do not "know how to make" species that come within the scope of the claims and is predictable when people of skill in the art know how to make species within the scope of the claims based on the teaching of the application under examination.

Thus the patent legal term "predictable" is not synonymous with the existence or a theory, but is synonymous with determinability without undue experimentation.

BV1 paragraph bridging pages 94-95 states in regards to non-precedential Board decision Ex parte Chen:

> In Ex parte Chen, an unpublished decision reported at 61 USPQ 1025, 1028, the Board of Patent Appeals and Interferences held claims to transgenic carp not unpatentable for lack of enablement stating:
>
> > In responding to appellants' arguments, the examiner urges that the level of experimentation is undue and points to the success rate 1% or 20 out of 1746 attempts for the integration of the gene into the embryos described in the specification, (Answer, pages 6 and 14). However, the examiner offers no evidence which would reasonably support a conclusion that one skilled in this art would regard this rate of success for the integration of the rtGH gene as evidencing undue experimentation. We remind the examiner that some experimentation may be required as long as it is not undue. *In re Vaeck 941* F.2d 488, 496, 20 USPQ2d 1438, 1445 (Fed. Cir. 1991). Appellants' disclosure explicitly describes the methodology to be used to arrive at the claimed transgenic carp. As the record now stands, the numbers emphasized by the examiner would reasonably appear to reflect the need for a repetitive procedure, rather than un-due experimentation by those wishing to practice the invention.
>
> Notwithstanding that the specification in Ex parte Chen disclosed only a 1% success rate in the examples described in

> the specification, the Board found the claims enabled since some experimentation may be needed to determine which examples work and which do not. The claims were found enabled since the experimentation was not undue. The need for a repetitive procedure to determine which examples have the desired result does not render the claims not enabled. That is, there was "how-to-make-and-use predictability" in the Ex parte Chen invention even though there appeared to have been no "theoretical predictability" and even though the Ex parte Chen applicant could not foresee in advance, predict in advance or specifically teach in advance of experimentation which species had the desired result. Thus, that Applicants' specification describes examples that either do not show a Tc greater than or equal to 7.26 K or examples that have phases with and without a Tc greater than or equal to 26 K does not mean that they have not enabled their genus claims.

Thus a low success rate, 1%, is not fatal to enablement when the experimentation is routine, i.e. species are determinable by routine experimentation. Routine repetitive procedures are sufficient to provide enablement

BV1 page 95, last 17 lines, further states:

> That the species within this genus which have the desired high Tc property may be determined experimentally and not by a theoretical means according to the Board's decision in Ex parte Chen, does not mean that Applicants genus claims are not enabled. The CCPA agrees with this when it states:
>
> > What the dissent seem to be obsessed with is the thought of catalysts which won't work to produce the intended result. Applicants have enabled those in the art to see that this is a real possibility, which is commendable frankness in a disclosure. Without undue experimentation or effort or expense the combinations which do not work will readily be discovered and, of course, nobody will use them and the claims do not cover them. The dissent wants appellants to make everything predictable in advance, which is impracticable and unreasonable. In re Angstadt. 190 USPQ 214, 219.
>
> From this it is clear that 35 U.S.C. 112, first paragraph, does not require everything to be predictable in advance and permits the

determination of the combinations that will and will not work by experimentation that is not undue.

BV1 page 95, lines 1-18, states

The USPTO Board of Patent Appeals and Interferences in Ex parte Jackson 217 USPQ 804 (Bd. App. 1982) states at 217 USPQ 804, 806-807:

> The first paragraph of 35 U.S.C. 112 requires that the disclosure of an invention be "in such a full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains or with which it is most nearly connected, to make and use the same ... Decisional law has interpreted the statutory requirement as dictating that sufficient information be given in the application so that one of ordinary skill in the art can practice the invention without undue experimentation. ...
>
> The determination of what constitutes undue experimentation in a give case requires the application of a standard or reasonableness, having due regard for the nature of the invention and the state of the art. ... The test is not merely quantitative, since a considerable amount of experimentation is permissible if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed to enable the determination of how to practice a desired embodiment of the invention claimed.

BV1 page 98, lines 19-24 states

The Court in In re Geerdes further states at 180 USPQ 993 "The Board expressed concern that 'experimentation' is involved in the selection of proportions and particle sizes, but this is not determinative of the question of scope of enablement. It is only undue experimentation that is fatal." There is no evidence that undue experimentation is needed "to make" materials to practice Applicants' claims. The Examiner refers to none.

BV1 paragraph bridging pages 101- 102 states:

The CCPA In re Angstadt and Griffin further states that:

> we cannot agree with the Board that Appellants' disclosure is not sufficient to enable one of ordinary skill in the art to practice the invention without undue experimentation. We note that many chemical processes and catalytic processes particularly, are unpredictable, ... , and the scope of enablement varies inversely with the degree of unpredictability involved... The question, then, whether in an unpredictable art, section 112 requires the disclosure of a test with every species covered by a claim. To require such a complete disclosure will apparently necessitate a patent application or applications with 'thousands ' of examples... . More importantly, such a requirement would force an inventor to seek adequate patent protection to carry out a prohibited number of natural experiments. This would tend to discourage inventors in filing patent applications in an unpredictable area since the patent claim would have to be limited those embodiments which are expressly disclosed. A potential infringer could readily avoid 'infringement of such claims' by merely finding another analogous (example) which could be used 190 USPQ 124, 218.

Thus Applicants do not have to specifically identify in the specification all species that come within the scope of their claims.

BV1 page102, line 6-10, states:

The CCPA In re Angstadt further goes on to say

> having decided that appellants are *not* required to disclose every *species* encompassed by the claims even in an unpredictable art such as the present record presents, each case must be determined on its own facts. 190 USPQ 214, 218. (emphasis in the original).

BV1 Page 103, lines 7-15, states:

In re Angstadt further states at 190 USPQ 219:

> We note that the PTO has the burden of giving reasons, supported by the record as a whole, why the specification is not enabling. In re Armbruster, 512 F.2d 676, 185 USPQ 152 (CCPA 1975). Showing that the disclosure entails undue experimentation is part of the PTO's initial burden under Armbruster; this court has never held that evidence of the necessity for *any* experimentation, however slight, is sufficient to require the applicant to prove that the type and amount of experimentation needed is not undue.

As will be gone over in detail below the Board's Decision ignores this support in legal authority and merely states that they are unconvinced.

## 4. SECTION

DB1 pages 7-10 under heading "Finding of Fact" and under subheading "The Specification" quotes selected sections of the Specification. As noted in Section 3 of Appellants' Request To Reopen Prosecution submitted herewith the Board's Decision specifically identifies facts that were not specifically identified in the Total Final Rejection or in the Examiner's Answer. Thus as agued in the Request to Reopen Prosecution the Board's Decision's reliance on facts not relied on by the Examiner result in the Board's Decision being more in the nature of an action on the merits than a decision on appeal.

Appellants note that each of Appellants' claims has support in the Specification as shown in BV2. This is undisputed by the Total Final Action, the Examiner's Answer or the Board's Decision.

## 5. SECTION

DB1 pages10- 11 under heading "Finding of Fact" and under subheading "The Examiner's Evidence" quotes selected sections of the Examiner's Evidence which were for the first time introduced into the

prosecution of this application in the Final Action and referred to in the Examiner's Answer. That evidence is:

I. the Schuller article "A Snapshot View of High-Temperature Superconductivity 2002," BD footnote 2 at page 6, and

II. the article entitled "Exploring Superconductivity." (Appellants note that this is an article that appears to have only appeared on the internet and is not currently available on the internet. ) BD footnote 3 at page 6

BD page1, lines 8-12, state:

> Unpredictability in this art also is supported by the Examiner's uncontested findings that the Specification discloses **numerous** compounds or compositions which fall within the compositional definitions of the rejected claims yet fail to exhibit superconductivity at temperatures greater than or equal to 26°K (Ans., first full para, at 9, para, bridging 11-12).
> (Emphasis added.)

This is an error of fact .Appellants' Specifications does not "discloses **numerous** compounds or compositions which fall within the compositional definitions of the rejected claims yet fail to exhibit superconductivity at temperatures greater than or equal to 26°K." (Emphasis added.) Appellants have never agreed to or acknowledged there are such "numerous compounds or compositions" disclosed in their Specification. Neither the Total Final Action, the Examiner's Answer nor the Board's Decision specifically identify such "numerous compounds or compositions" disclosed in their Specification. The paragraph quoted above from the Board's Decision refers to the first full paragraph of page 9 of the Examiner's answer. Appellants believe that the correct paragraph is the second full paragraph of page 9 which states:

> The present specification actually shows that known forms of "a transition metal oxide", "a composition", and "a copper-oxide compound" do **not** show the onset of superconductivity at above 26/K. At p. 3, line 20, through p. 4, line 9, of their disclosure, the applicants state that

> the prior art includes a "Li-Ti-0 system with superconducting onsets as high as 13.7/K." Official Notice is taken of the well-known fact that Ti is a transition metal. That disclosure also refers to "a second, non-conducting CuO phase" at p. 14, line 18. Accordingly, the present disclosure is not deemed to have been fully enabling with respect to the "transition metal oxide" of claim 24, the "composition" of claim 88, or the "copper-oxide compound" of claim 96.

This paragraph only refers to one material, Li-Ti-0, that has a $T_C$ less than 26 K and refers to "a second, non-conducting CuO phase" at page 14, line 18 of the Specification. This is only two examples. The second example is a mixed phase material that is superconducting with $T_C$ greater than or equal 26 K. Thus this second example is not an example of a material that "fail[s] to exhibit superconductivity at temperatures greater than or equal to 26°K." See BV1 page 118, lines 2-3. Appellants' claims are not directed to 100% superconductive material.

The paragraph bridging pages 11-12 of the Examiner's Answer states:

> With a 1:1 ratio of (Ba, La) to Cu and an x value of 0.02, the La-Ba-Cu-0 form (i.e., "RE-AE-TM-O", per p. 8, line 11) shows "no superconductivity". With a 2:1 ratio of (Ba, La) to Cu and an x value of 0.15, the La-Ba-Cu-0 form shows an onset of superconductivity at "$T_c$ = 26/K". It should be noted, however, that all of the claims in this application require the critical temperature ($T_c$) to be "in excess of 26/K" or "greater than 26/K".

There is only one example of a material in this quoted language from the Examiner's Answer that is not superconductive.

Thus the sections of the Examiner's Answer referred to by the Board's Decision in the paragraph quoted above refers to at most two materials that are not superconductors as claimed by Appellants', one of which is a previously know material that is metallic. Thus the Examiner's Answer does not show that Appellant's Specification discloses "**numerous**

compounds or compositions which fall within the compositional definitions of the rejected claims" as stated by the Board's Decision quoted above. Appellants do not believe two is numerous.

### 6. Section

The Summary of Appellant's Evidence at BD pages 11 -13 highlight only selected portions of Appellants" evidence.

### 7. Section

BD pages 13- 15 lists the "Principles of Law" applied in the Board's Decision. Appellants disagree that the quoted passages from the cited CAFC decisions

*Genentech, Inc. v. Novo NordiskA/S,* 108 F.3d 1361 (Fed. Cir. 1997)

*In re Wright,* 999 F.2d 1557 (Fed. Cir. 1993), and

*In re Wands,* 858 F.2d 731, (Fed. Cir. 1988)

listed at these pages accurately reflect the law of enablement as it should be applied to the claims for which the Board's Decision has not reversed the Examiner's rejections for lack of enablement under 35 U.S.C. 112, first paragraph. Each of these three CAFC decisions is direct to enablement of biotechnology inventions. For each of these CAFC decisions the Board's Decision "divorces the court's holding from the facts upon which it was rendered." Ricoh Co. Ltd. v. Quanta Computer Inc., 550 F.3d 1325, 1339 (Fed. Cir. 2008)

In addition the Board's Decision is contrary to its own precedent Ex parte Jackson 217 USPQ 804 (Bd. App. 1982). BV1, page 97, lines 1-7, states

> The Board in Ex parte Jackson further states at 217 USPQ 808 "The problem of enablement of processes carried out by microorganisms were uniquely different from the field of chemistry generally. Thus, we are convinced that such recent cases as In re Angstadt 537 F.2d 498, 190 USPQ 214 (CCPA 1976) and In re Geerdes 491 F.2d 1260, 180 USPQ 789 (CCPA 1974) are in apposite to this case."

> Therefore, since the present application is not directed to biotechnology or microorganism invention, the decision of Ex parte Jackson does not apply, but In re Angstadt and In re Geerdes do apply.

The Board's Decision has essentially ignored *In re Angstadt* and *In re Geerdes* which the Board's precedent *Ex parte Jackson* says should apply. Appellant's Brief and Appellant's Replies are primarily focused on *In re Angstadt* and the decisions which rely on it and apply it.. The Board's Decision is primarily based on *Genentech, Inc. v. Novo Nordisk* which is not relied on by the Total Final Action or the Examiner's Answer. The Board's Decision secondarily relies on *In re Wright* which the Examiner's Answer only cursorily cites at page 26, lines 9-15, but does not explicitly apply. Also the Total Final Action only cursorily cites *In re Wright* which it does not apply. The Board's Decision thirdly relies on *In re Wands* which is not relied on by the Total Final Action or the Examiner's Answer. Each of these three decisions is a biotechnology decision.. For the reasons given in Appellants' Request that Prosecution be Reopened submitted with this Request for Rehearing, Appellants' request that prosecution be reopened so that Appellants will not be responding to arguments presented for the first time in the Board's Decision in this Request for Rehearing.

It s Appellants position that the decision that should be applied to the facts and technology of the claims on appeal is the United States Supreme Court decision *Minerals Separation, Ltd. v. Hyde*, 242 U.S. 261 (1916) which *In re Angstadt*, 537 F.2d 498, 503-504 (C.C.P.A. 1976) 190 USPQ 214 relies on for its holding. (BV1 page 228 last full paragraph) . *Minerals Separation, Ltd. v. Hyde* is the most recent United States Supreme Court decision on enablement. The applicability of *Minerals Separation, Ltd. v. Hyde Minerals Separation, Ltd. v. Hyde* to the rejected claim is explained in detail at BV1 pages 228-237. The Board' Decision has made no comment on *Minerals Separation, Ltd. v. Hyde*. This has resulted in errors of law in the Board's Decision. The Board's application of, *Genentech, Inc. v. Novo*

*NordiskA/S*, 108 F.3d 1361, *In re Wright* and *In re Wands* to the claims of the present application is inconsistent with the Supreme Courts' decision in *Minerals Separation, Ltd. v. Hyde*. Thus the manner in which the Board has applied these CAFC decisions is an error of law.

**8. Section**

***In re Wright*, 999 F.2d 1557**

The Board's Decision at BD page 13, line 3 to BD page 14, line 2 quotes and paraphrase passage from *In re Wright*. These quoted passages and paraphrases are accurate, but leave out substantial parts of the *In re Wright* decision that has resulted in the Board's application of *In re Wright* being an error of law. The Board's Decision inappropriately "divorces the court's holding from the facts upon which it was rendered." Ricoh Co., Ltd. v. Quanta Computer Inc., 550 F.3d 1325, 1339 (Fed. Cir. 2008) resulting in the errors of law.

*In re Wright* states" [t]he claims on appeal are directed to processes for producing live, non-pathogenic vaccines against pathogenic RNA viruses ..vaccines produced by these processes ... and methods of using certain of these claimed vaccines to protect living organisms against RNA viruses ... Wright's specification provides a general description of these processes, vaccines, and methods of use, but only a single working example." In re Wright, 999 F.2d 1557, 1559 (Fed. Cir. 1993)

*In re Wright* further states "[t]he Examiner argued that Wright's single working example merely evidenced that Wright had obtained successfully a particular recombinant virus vaccine, and that this single success did not provide 'sufficient likelihood' that other recombinant RNA viruses could be constructed without undue experimentation." In re Wright, 999 F.2d 1557, 1560 (Fed. Cir. 1993) In contradistinction, Appellants' specification is not limited to one example and is not directed to living organisms. Applicants note that the Board's precedential decision in *Ex parte Jackson* supra

recognizes that enablement is applied differently in different contexts when it says at 217 USPQ 808 "[t]he problem of enablement of processes carried out by microorganisms were uniquely different from the field of chemistry generally." (BV1sentece bridging pages 141-142.)

*In re Wright* further states "that many of the appealed claims encompass vaccines against AIDS viruses and that, because of the high degree of genetic, antigenic variations in such viruses, no one has yet, years after his invention, developed a generally successful AIDS virus vaccine."
In re Wright, 999 F.2d 1557, 1562 (Fed. Cir. 1993). In contradistinction, it is undisputed that within a very short time after Appellants' discovery it was duplicated and other species within the scope of their claims were found in a short time, as corroborated by Poole 1988 (Brief Attachments AF and AW) which states that the chemistry involved in making high $T_C$ superconductors does not have to be understood to make these superconductors. (BV1 page 134, lines 16-20.)

*In re Wright* further states in regards to an article published 5 years after the Wright patent application was filed that the article showed that " the physiological activity of RNA viruses was sufficiently unpredictable that Wright's success in developing his specific avian recombinant virus vaccine would not have led one of ordinary skill in the art to believe reasonably that all living organisms could be immunized against infection by any pathogenic RNA virus by inoculating them with a live virus containing the antigenic code but not the pathogenic code of that RNA virus. **The general description and the single example** in Wright's specification, directed to a uniquely tailored in vitro method of producing in chicken C/O cells a vaccine against the PrASV avian tumor virus containing live RAV-Ac virus particles, did nothing more in February of 1983 than invite experimentation to determine whether other vaccines having in vivo immunoprotective activity could be constructed for other RNA viruses."In re Wright, 999 F.2d 1557, 1562 (Fed. Cir. 1993) (Emphasis added.) In contradistinction, there is no

corresponding publication in the present appeal and in contradistinction the Poole 1988 Enablement Statement (BV3 pages 6-7), the Poole 1995 Enablement Statement (BV3 page 7) and the Poole 1996 Enablement Statement (BV3 pages 7-8) state directly to the contrary.

*In re Wright* further states "[t]he Examiner made reference to the difficulty that the scientific community is having in developing generally successful AIDS virus vaccines merely to illustrate that the art is not even today [years after the initial filing date] as predictable as Wright has suggested that it was back in 1983." In re Wright, 999 F.2d 1557, 1563 (Fed. Cir. 1993) In contradistinction there is no evidence in the present record that persons or ordinary skill in the art have any difficulty making and testing samples that come within the scope of Appellants' claims

*In re Wright* further states "Wright has failed to establish by evidence or arguments that, in February of 1983 [Wrights filing date], a skilled scientist would have believed reasonably that Wright's success with a particular strain of an avian RNA virus could be extrapolated with a reasonable expectation of success to other avian RNA viruses. Indeed, Wright has failed to point out with any particularity the scientific literature existing in February of 1983 that supports his position." In re Wright, 999 F.2d 1557, 1564 (Fed. Cir. 1993) In contradistinction, Appellants extensive evidence shows that the methods of making high $T_C$ superconductors described in their application where the same methods used to make materials prior to the earliest filing date and that other materials were made shortly after their discovery by the same methods and in addition Appellants' have pointed out with extensive and specific particularity scientific literature existing prior to their earliest filling date which supports this position. See affidavits in Brief Attachments AH, AI, AJ, AK, AL AM, AN and AO (the last three of which are referred to as the DST Affidavits) referred to throughout Appellants' Brief and in Appellant's Replies all of which are based on methods of making materials known prior to Appellant's earliest filing date.(See for example RB page 6, lines 7-10.) And, see the Poole 1988

Enablement Statement (BV3 pages 6-7), the Poole 1995 Enablement Statement (BV3 page 7) and the Poole 1996 Enablement Statement (BV3 pages 7-8) which refer to materials made after Appellants' discovery, but which explicitly show that known methods were used to make those materials. It is unrebutted in the persecution of the present application, including in the Board's Decision, that only method know prior to Appellants' discovery and describe in their Specification are used to make and test species that come within the scope of Appellant's claims. Thus persons of ordinary skill in the art as of Appellants' earliest filing date had a reasonable expectation of success of making and testing species that come within the scope of Appellant's claims.

. Appellant's Brief argues why *In re Wright* support Appellants" argument for why their claims are enabled at BV pages 87, 88, 90, 108, 129, 146, 208 and 218. These arguments are unrebutted in the Board's Decision

**9. Section**

***Genentech, Inc. v. Novo NordiskA/S*, 108 F.3d 1361**

The Board's Decision at BD page 14, line 3 to BD page 15, line 3 quotes passage from *Genentech, Inc. v. Novo NordiskA/S.(Genentech)* These quoted passages are accurate, but leave out substantial parts of the *Genentech* decision that has resulted in the Board's application of *Genentech* being an error of law. The Board's Decision inappropriately "divorces the court's holding from the facts upon which it was rendered." Ricoh Co., Ltd. v. Quanta Computer Inc., 550 F.3d 1325, 1339 (Fed. Cir. 2008) resulting in the errors of law.

*In Genetech* the claim found not enabled was directed to a method of producing an encoded protein consisting essentially of amino acids of human growth hormone "reciting that the encoded protein has an ,,,, amino acid sequence and includes the step of cleaving this conjugate protein. This process of expressing a DNA encoding a conjugate protein and using an

enzyme to cleave off an undesired portion of that protein is generally known as cleavable fusion expression." Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1363 (Fed. Cir. 1997)

The first paragraph quoted at DB page 14 from *Genentech* leaves out the beginning of the first sentence "[w]e agree with Novo" Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1366 (Fed. Cir. 1997) Thus this quoted paragraph is in response to an argument made by Novo which is:

> Novo asserts that at the time of filing, trypsin and other like enzymes were used only to digest proteins, not to specifically and precisely cleave conjugate proteins to yield intact, useful proteins, and that the British patent explicitly indicates that trypsin would not be useful for the cleavable fusion expression of arginine-containing proteins such as hGH. Novo further argues that neither the specification nor the references cited by Genentech suggest a single amino acid sequence, out of the virtually infinite range of possibilities, that would yield hGH in a useful form when cleaved from the conjugate protein. This process of expressing a DNA encoding a conjugate protein and using an enzyme to cleave off an undesired portion of that protein is generally known as cleavable fusion expression This process of expressing a DNA encoding a conjugate protein and using an enzyme to cleave off an undesired portion of that protein is generally known as cleavable fusion expression
>
> Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1366 (Fed. Cir. 1997)

In redacted form this states "Novo asserts that at the time of filing, trypsin [was] used only to digest proteins, **not to** ... cleave conjugate proteins to yield intact, useful proteins, and that the British patent explicitly indicates that trypsin would not be useful for the cleavable fusion expression of arginine-containing proteins ... Novo further argues that **neither the specification nor the references cited by Genentech suggest a single amino acid sequence,..that would yield hGH in a useful form when cleaved from the conjugate protein ...** using an enzyme to cleave off an

undesired portion of that protein is generally known as cleavable fusion expression. ." Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1363 (Fed. Cir. 1997) (Emphasis added.)

In regards to the evidence presented by the plaintiff *Genetech* states "[t]here is no dispute that the portion of the specification chiefly relied upon by Genentech ... does not describe in any detail whatsoever how to make hGH using cleavable fusion expression. For example, no reaction conditions for the steps needed to produce hGH are provided; no description of any specific cleavable conjugate protein appears. The relevant portion of the specification merely describes three (or perhaps four) applications for which cleavable fusion expression is generally well-suited and then names an enzyme that might be used as a cleavage agent (trypsin), along with sites at which it cleaves ... Thus, the specification does not describe a specific material to be cleaved or any reaction conditions under which cleavable fusion expression would work."Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1365 (Fed. Cir. 1997)

*Genetech* states in regards to the patent in dispute "the specification .... does not provide a specific enabling disclosure concerning what the new claim recites, viz., obtaining hGH by cleaving an hGH-containing conjugate protein..... Genentech is attempting to bootstrap a vague statement of a problem into an enabling disclosure sufficient to dominate someone else's solution of the problem. This it cannot do." Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1366 (Fed. Cir. 1997)

Thus in *Genetech* the patent did not have any working examples of what it was purporting to be "new", i.e., what they

invented a process "obtaining hGH by cleaving an hGH-containing conjugate protein."

There is no corresponding evidence in the prosecution of the present application. In contradistinction Appellants' Specification teaches specific working examples that are species within the scope of every claim rejected as not enabled including those for which the Board's Decision did not reveres the Examiner's rejection. This is undisputed in the present application. Those species were made and tested by methods know prior to Appellants' earliest filing date. This is undisputed. It is also undisputed that nothing more is needed than these know methods to make and test other species within the scope of Appellant's claims. What is new in Appellants' invention is not a method of making and testing species that come within the scope of their claims, but that ceramic materials which were not know to be high temperature superconductors were in fact superconductors having a $T_C$ greater than of equal to 26K. There is no evidence that there are species within the scope of Appellant's claims for which the Board's Decision did not reverse the Examiner's rejection that can not be made and tested by the methods described in Appellants' Specification.

*Genetech* further states that the evidence showed that 'no one had been able to produce any human protein via cleavable fusion expression as of the application date. If, as Genentech argues, one skilled in the art, armed only with what the patent specification discloses... could have used cleavable fusion expression to make a human protein without undue experimentation, it is remarkable that this method was not used to make any human protein for nearly a year ..., or to make hGH for five years.... This failure of skilled scientists, who were supplied with the teachings that Genentech asserts were sufficient and who

were clearly motivated to produce human proteins, indicates that producing hGH via cleavable fusion expression was not then within the skill of the art." Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1367 (Fed. Cir. 1997) Thus in *Genetech* what Genetech was claiming was new, the method of "cleavable fusion expression," was not used prior to filing their patent applications and what their method claimed as being made "hGh" was not used to make hGh until 5 years after their filing date. It is clear from *Genetech* that the Genetech patent did not show that the inventors understood how to practice "cleavable fusion expression" but were alleging in the litigation that persons of skill in the art could practice "cleavable fusion expression" from their teaching without undue experimentation. *Genetech* holds that since "cleavable fusion expression" is the new feature of the invention, how to do this had to be described. In contradistinction, the methods used in Appellants' Specification to make and test species were know prior to Appellants' earliest filing date and were applied quickly after their discovery by others following their teaching to make and test other species as stated by Poole 1988, Poole 1995 and Poole 1996 ( See the Poole 1988 Enablement Statement (BV3 pages 6-7), the Poole 1995 Enablement Statement (BV3 page 7) and the Poole 1996 Enablement Statement (BV3 pages 7-8) The evidence in the present application indicates exactly contrary to what the evidence indicates in *Genetech*. What Appellants' evidence shows is undisputed. Appellants' evidence shows that all that was needed to make and test other species is what Appellants' Specification teaches about the method to make and test other species. This is undisputed.

*Genetech* further states: "it stands to reason that if the disclosure of a useful conjugate protein and the method for its cleavage were so clearly within the skill of the art, it would have

been expressly disclosed in the specification, and in the usual detail. Patent draftsmen are not loath to provide **actual or constructive examples, with details, concerning how to make what they wish to claim."** Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1367 (Fed. Cir. 1997). (Emphasis added.) In contradistinction, Appellants' Specification has provided "actual [and] constructive examples, with details, concerning how to make [ and test] what they [have claimed]."

**10. Section**

***In re Wands, 858 F.2d 731***

The Board's Decision at BD page 15, line 4 to BD page 15, last line, quotes passage from *In re Wands.* These quoted passages are accurate, but leave out substantial parts of the *In re Wand* decision that has resulted in the Board's application of *In re Wand* being an error of law. The Board's Decision inappropriately "divorces the court's holding from the facts upon which it was rendered." Ricoh Co., Ltd. v. Quanta Computer Inc., 550 F.3d 1325, 1339 (Fed. Cir. 2008) resulting in the errors of law.

Appellants note that *In re Wands* is directed to a biotechnology invention. But, unlike *In re Wright* and *Genentech* the claims under review for lack of enablement in *In re Wands* were found enabled.

The first quotation listed by the Board's Decision at page 15, lines 4-7, is :

> Enablement is not precluded by the necessity for some experimentation such as routine screening. n19
> In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988)

In the Board's Decision the citations in footnote 19 are left out which are:

> *Atlas Powder Co. v. E.I. DuPont De Nemours & Co.*, 750 F.2d 1569, 1576, 224 USPQ 409, 413 (Fed. Cir.

1984); *In re Angstadt*, 537 F.2d at 502-504, 190 USPQ at 218; In re Geerdes, 491 F.2d 1260, 1265, 180 USPQ 789, 793 (CCPA 1974); *Minerals Separation, Ltd. v. Hyde*, 242 U.S. 261, 270-71, 61 L. Ed. 286, 37 S. Ct. 82 (1916).

In each of these decisions claims being reviewed for lack of enablement were found enabled essentially because only "routine screening" was need to find species the came within the scope of the claims under review. The claims under review in *In re Wands* were found enabled essentially for the same reasons. Appellants' Brief argued that only routine experiments are needed to make and test species within the scope of all claim rejected for lack of enablement. Appellants' agued that *In re Wands*, *In re Angstadt* and *Minerals Separation, Ltd. v. Hyde Minerals Separation, Ltd.* supported their argument.. The Board's Decision has essentially ignored Appellants' argument by not responding to it or acknowledging it. These decisions found "routine screening" using known techniques was sufficient to determine species that came with in the scope of the claim under view which were thereby enabled. This is the principle of law that should apply to the claims presently under appeal and for which the Board's Decision has not reversed the Examiner's rejection. Appellants'' Brief and Appellants' Replies refers to *In re Angstadt* at BV1, pages 46, 49, 70, 73, 74, 95, 97, 98, 101 – 108 (these pages have a comprehensive discussion of this decisions applicability to the claims rejected in the present application), 128, 135, 136, 138, 146, 152, 154, 169, 223, 224, 232 and RB pages 20, 21 and 23. Appellants'' Brief refers to *Minerals Separation, Ltd. v. Hyde Minerals Separation, Ltd. v. Hyde* at BV BV1 pages 228 to 237.

The second quotation from *In re Wands* listed by the Board's Decision at page 15, lines 9-17, includes the following quotation from *In re Angstadt* the statement "[t]he test is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, **or** if the specification in question provides a reasonable amount of

guidance with respect to the direction in which the experimentation should proceed." (Emphasis added.) It is undisputed in the present appeal that the experimentation to determine other species of high $T_C$ materials within the scope of the claims is what was know prior to Appellants' earliest filing date which is thus routine. Thus following *In re Wands* a considerable amount of this type of experimentation is permissible.

Appellants note that the passage quoted above from *In re Wands* states that a "considerable amount" of "routine" experimentation **or** "reasonable guidance with respect to the direction in which the experimentation should proceed" is needed to satisfy enablement **but not both** routine experimentation and reasonable guidance is needed.

*In re Wands* states in regards to the claims under review "[t]he nature of monoclonal antibody technology is that it involves screening hybridomas to determine which ones secrete antibody with desired characteristics. Practitioners of this art are prepared to screen negative hybridomas in order to find one that makes the desired antibody." In re Wands, 858 F.2d 731, 740 (Fed. Cir. 1988) Similarly, in Appellants' claims only require routine methods of fabrication and testing which practitioners in the art are prepared to do in order to find other high $T_C$ materials to practice the claimed invention.

Appellants' Brief shows why *In re Wands* supports their argument that their claims are enabled at BV1 pages 46, 47, 49, 69,83, 91, 111, 124, 125 to128, 170, 223, and 224 and RB page 52. These arguments are unrebutted in the Board's Decision.

### 11. Section
### *Minerals Separation, Ltd. v. Hyde Minerals Separation, Ltd. v. Hyde 242 U.S. 261*

The paragraph bridging BV1 pages 228 229 states:

The CCPA states in In re Angstadt, 537 F.2d 498, 503-504 (C.C.P.A. 1976) 190 USPQ 214 citing the United Stated Supreme Court decision Minerals Separation, Ltd. v. Hyde, 242 U.S. 261, 270-71 (1916):

> To require disclosures in patent applications to transcend the level of knowledge of those skilled in the art would stifle the disclosure of inventions in fields man understands imperfectly, like catalytic chemistry. The Supreme Court said it aptly in Minerals Separation, Ltd. v. Hyde, 242 U.S. 261, 270-71 (1916), in discussing the adequacy of the disclosure of the froth flotation process of ore separation:
>
> > **Equally untenable is the claim that the patent is invalid for the reason that the evidence shows that when different ores are treated preliminary tests must be made to determine the amount of oil and the extent of agitation necessary in order to obtain the best results. Such variation of treatment must be within the scope of the claims, and the certainty which the law requires in patents is not greater than is reasonable, having regard to their subject-matter. The composition of ores varies infinitely, each one presenting its special problem, and it is obviously impossible to specify in a patent the precise treatment which would be most successful and economical in each case. The process is one for dealing with a large class of substances and the range of treatment within the terms of the claims, while leaving something to the skill of persons applying the invention, is clearly sufficiently definite to guide those skilled in the art to its successful application, as the evidence abundantly shows. This satisfies the law. Mowry v. Whitney, 14 Wall. 620; Ives v. Hamilton, 92 U.S. 426, and Carnegie Steel Co. v. Cambria Iron Co., 185 U.S. 403, 436, 437** [Emphasis added.]

The text in bold shall be referred herein to as The Supreme Court Minerals v. Hyde Enablement Statement.

**12. Section**

The Board's Decision states at page 17, lines 17 -20:

> The Examiner explicitly criticizes Appellants' affidavit evidence as "conclusory only" (Ans. 15) although no specific reasons are given for considering the affidavits to be "conclusory only" with respect to the claims discussed in this subsection.

Appellants disagree that the language quoted from Board's Decision accurately represents the facts.

Appellants Reply page 3, lines 3-7 states:

> The Examiner's Answer is essentially verbatim copied from the Office Action dated 07/28/2004 and the Final Action. The Examiner's Answer from page 5, line 12 to page 20, line 6 is essentially copied from the Office Action of 07/28/2004. The Examiner's Answer from page 20, line 7 to page 29, line 11, is essentially copied from the Final Action.

Thus Appellants submit that the referred to comment," conclusory only" from page 15 of the Examiner's Answer is referring only to Appellants.' affidavits submitted prior to OA07282004 and not to what Appellants have referred to as the DST Affidavits (Brief Attachments AM to AO) which were submitted after OA07282004 or the declaration of Bednorz (Brief Attachment AQ), which was submitted after the Final Action, or the Affidavit of Newns (Brief Attachment AQ) which was submitted after the Final Action.

Appellants specifically noted this in Appellants Reply at page 6, lines 1-20, which states (Text in bold square brackets is added for clarity):

> At page 12 of the Examiner's Answer, the first sentence of the last paragraph states "[t]he Applicants also have submitted three affidavits attesting to the applicants' status as the discoverers of materials that superconduct > 26°K." At page 15 of the Examiner's Answer, lines 14-15 states "3 affiants." As stated in the Brief in this passage the Examiner incorrectly states Applicants submitted three affidavits. Prior to the Office Action of 07/28/2004 [which is incorporated into the Final Action at page 4 thereof] Applicants submitted the five affidavits of Brief Attachments AH, AI, AJ, AK, AL of Mitzi, Dinger, Tsuei, Shaw and Duncombe, respectively. Subsequent to the Office Action of 07/28/2004 Applicants submitted the expanded affidavits of Shaw, Tsuei and Dinger of Brief Attachments AM, AN and AO, respectively **[referred to in Appellants' Brief as the DST Affidavits]**. The expanded affidavits set forth particular facts to support the

> conclusions that all superconductors based on Applicants' work behave in the same way and that one skilled in the art can make those superconductors without undue experimentation. In the Answer the Examiner has not responded to these affidavits. In addition subsequent to the Office Action of 07/28/2004 Applicants submitted the Newns Affidavit (Brief Attachment AP) and declaration of co-inventor Georg Bednorz (Brief Attachment AQ). **[Appellants note that the News Affidavit and the Bednorz Declaration were submitted in response to new arguments in the Final Action and were thus submitted subsequent to the Final Action]** In the Answer the Examiner has not responded to the Newns Affidavit or the Bednorz declaration. The Examiner has not rebutted this evidence (including the other evidence submitted by Applicants) and thus has not made a prima facie case of lack of enablement.

Thus as agued in the Request to Reopen Prosecution the Board's Decision's reliance on facts and arguments not relied on by the Examiner's Answer results in the Board's Decision being more in the nature of an action on the merits than a decision on appeal. Appellant's request the Board grant Appellants' Request to Reopen Prosecution submitted herewith.

**13. Section**

The Board's Decision from BD page 17, two lines from the bottom to page 19 5 lines from the bottom, focuses on specific types of material taught in Appellant's Specification. It is noted that it is unrebutted that all of Appellants' claims have written description support in the specification. Appellant's Brief at BV1 page 104, lines 10-16, states:

> The CCPA in In re Marzocchi, 58 CCPA 1069, 439 F. 2d 220, 169 USPQ 367, 369-370 (1971) states:
>
> > The only relevant concern of the Patent Office under these circumstances should be over the *truth* of any such assertion. The first paragraph of §112 requires nothing more than objective enablement. How such a teaching is set forth, either by the use of illustrative examples or by broad terminology, is of no importance.

This quoted language from *In re Marzocchi* is directed to enablement in the context of a chemical. Thus "broad terminology" is sufficient to satisfy enablement and specifically identifying species that come within the scope of the claims is not and absolute requirement.

The legal authority cited by Appellant supports this position. BV1, page 47 7 lines from the bottom to page 48 line 25, states:

> The CAFC has stated in Sri Int'l v. Matsushita Elec. Corp., 775 F.2d 1107, 1121 (Fed. Cir. 1985); 227 USPQ 577, 586 that this is not necessary:
>
> > The law does not require the impossible. Hence, it does not require that an applicant describe in his specification every conceivable and possible future embodiment of his invention. The law recognizes that patent specifications are written for those skilled in the art, and requires only that the inventor describe the "best mode" known at the time to him of making and using the invention. 35 U.S.C. § 112.
>
> Applicants have shown that persons of ordinary skill in the art as of Applicants discovery can practice Applicants' claims to their full scope and it is Applicants' understanding of the Examiner's statements that the Examiner has agreed with this.
>
> The CAFC has further stated:
>
> > An applicant for patent is required to disclose the best mode then known to him for practicing his invention. 35 U.S.C. § 112. He is not required to predict all future developments which enable the practice of his invention in substantially the same way. Hughes Aircraft Co. v. United States, 717 F.2d 1351, 1362 (Fed. Cir. 1983);39 USPQ2d 1065.
>
> This is exactly what applicants have done. Thus Applicants' claims are enabled.
>
> The CAFC further states in regards to future developments:
>
> > Enablement does not require the inventor to foresee every means of implementing an invention at pains

> of losing his patent franchise. Were it otherwise, claimed inventions would not include improved modes of practicing those inventions. Such narrow patent rights would rapidly become worthless as new modes of practicing the invention developed, and the inventor would lose the benefit of the patent bargain. Invitrogen Corp. v. Clontech Labs., Inc., 429 F.3d 1052, 1071 (Fed. Cir. 2005)" And, "Our case law is clear that an applicant is not required to describe in the specification every conceivable and possible future embodiment of his invention." Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1344, 60 U.S.P.Q.2D (BNA) 1851 (Fed. Cir. 2001).
>
> The Examiner's position in regards to the enablement of Applicants' claims is inconsistent with the CAFC's position that "[e]nablement does not require the inventor to foresee every means of implementing an invention." Thus Applicants' claims are enabled and the rejection should be reversed. The Examiner uses the term predictable with the meaning of "foresee." The correct meaning of the term "predictable" for enablement purposes is "determinable" without undue experimentation.

The Board's Decision has not commented on nor rebutted Appellants' citation to and application of *Rexnord* to show why their claims on appeal are enabled, including those for which the Board has not reversed the Examiner's rejections, and that enablement "[e]nablement does not require the inventor to foresee every means of implementing an invention" as stated in *Rexnod* . That is, enablement does not require inventors to predict or foresee "every conceivable and possible future embodiment of [their] invention" at the time the application is filed

BV1 page 113, 8 lines from the bottom to page 114, line 15, states;

The CCPA in In re Robins 166 USPQ552, 555 has stated

> Both the Examiner and the board seem to have taken the position that in order to "justify," as the Examiner said, or to "support," as the board said, broad generic language in a claim, the specification must be equally broad in its

> meaning, and use in examples, of representative compounds encompassed by the claim language. This position, however, misapprehends the proper function of such disclosure. Mention of representative compounds encompassed by generic claim language clearly is not required by §112 or any other provision of the statute. But, where no explicit description of a generic invention is to be found in the specification (which is not the case here) mention of representative compounds may provide an implicit description upon which to base generic claim language. ... Similarly, representative examples are not required by the statute and are not an end in themselves. Rather, they are a means by which certain requirements of the statute may be satisfied. Thus, inclusion of a number of representative examples in a specification is one way of demonstrating the operability of a broad chemical invention and hence, establishing that the utility requirement of § 101 has been met. It also is one way of teaching how to make and/or how to use the claimed invention, thus satisfying that aspect of § 112.
>
> Thus Applicants are not limited, as the Examiner has done, to claims only covering the specific examples that they have described in the specification.

The Board's Decision has not commented on nor rebutted Appellants' citation to and application of *In re Robbins* to show why their claims on appeal are enabled, including those for which the Board has not reversed the Examiner's rejections, and that the scope of enablement in a broadly described and claimed invention, even in a chemical art, is not limited by the representative examples described in Appellants' Specification which is what the Board's Decision appears to have done. Since, enablement does not require inventors to predict or foresee "every conceivable and possible future embodiment of [their] invention" at the time the application is filed, as stated in *Rexnord Corp. v. Laitram Corp* (Supra), the examples sited in Appellants' Specification, following *In re Robbins,* does not limit enabled claims to these examples. It is Appellants' position that this applies to the claims for which the Board's Decision has not reversed the Examiner's rejection. It is Appellants' position that under the facts and circumstances of

the present application this applies to what the Board's Decision has indicated is allowable at page 7, lined 2-7, i.e. Appellants should not be limited to this scope of enablement. .

Appellants' Brief at BV1 page 127, lines 6-15 quoting the MPEP states:

> The fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation. In re Certain Limited-Charge Cell Culture Microcarriers, 221 USPQ 1165, 1174 (Int'l Trade Comm'n 1983), aff'd. sub nom., Massachusetts Institute of Technology v. A.B. Fortia, 774 F.2d 1104, 227 USPQ 428 (Fed. Cir. 1985).
>
> See also In re Wands, 858 F.2d at 737, 8 USPQ2d at 1404. The test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue. In re Angstadt, 537 F.2d 498, 504, 190 USPQ 214, 219 (CCPA 1976).

In the present application there is no direct evidence that anything other than what was known prior to Appellant's earliest filing date is need to make and use speciesthat come within the scope of the claims for which the Board's Decision has not reversed the Examiner's rejection.

BV1 paragraph bridging pages 124 and 125, states

> The CAFC in Enzo at 52 USPQ2d 1129, 1138 cites In re Vaeck 20 USPQ2d 1438 stating:
>
> > It is well settled that patent Applicants are not required to disclose every species encompassed by their claims, even in an unpredictable art. However, there must be sufficient disclosure, either through illustrative examples or terminology, to teach those of ordinary skill how to make and use the invention as broadly as it is claimed.

It is undisputed that Appellants have provided "illustrative examples **or** terminology to teach those of ordinary skill how to make and use the

invention as broadly as it is claimed "(Emphasis added.) Thus terminology alone is sufficient to satisfy enablement even in an unpredictable art. As stated throughout Appellants' Brief, the chemistry involved in making samples that come within the scope of the claims that the Board's Decision has not reversed the Examiner's rejection does not have to be understood to make samples by known methods and to test them by known methods. Thus the art of making high $T_C$ superconductors does not have the so called unpredictability, that is undeterminability, that is associated with "most chemical reactions." Appellants note that *In re Fisher* 427 F.2d 833 does not include all chemical reactions as unpredictable.( See BV1 page 44, lines 1-7.)

BV1 page 232, line 14 to page 233, line 32, states:

> The CCPA in In re Angstadt, 537 F.2d 498, 503 (C.C.P.A. 1976) 190 USPQ 214 commenting on the dissent states:
>
> > The dissent's reliance on In re Rainer, 54 CCPA 1445, 377 F.2d 1006, 153 USPQ 802 (1967), is misplaced. If Rainer stands for the proposition that the disclosure must provide "guidance which will enable one skilled in the art to determine, with reasonable certainty before performing the reaction, whether the claimed product will be obtained" (emphasis in original), as the dissent claims, then all "experimentation" is "undue," since the term "experimentation" implies that the success of the particular activity is uncertain. Such a proposition is contrary to the basic policy of the Patent Act, which is to encourage disclosure of inventions and thereby to promote progress in the useful arts.

In the present application the Examiner's position (proposition) is requiring what the CCPA states is not required and "[s]uch a proposition is contrary to the basic policy of the Patent Act, which is to encourage disclosure of inventions and thereby to promote progress in the useful arts." The certainty that the Examiner is requiring is beyond what the Supreme Court requires and what the Patent Act requires.

The CCPA applies the Supreme Court Minerals v. Hyde Enablement Statement in In re Bosy, 53 C.C.P.A. 1231, 1234-1235 (C.C.P.A. 1966) 149 U.S.P.Q. (BNA) 789 stating:

> The Supreme Court set out some guidelines with reference to the sufficiency of a specification to disclose an invention in such a manner as will enable one of ordinary skill in the art to make it in Minerals Separation, Ltd. v. Hyde, 242 U.S. 261 (1929), at 270-271: [Stating the Supreme Court Minerals v. Hyde Enablement statement quoted above.]

The CCPA also cite Minerals Separation, Ltd. v. Hyde, 242 U.S. 261 in In re Corr, 52 C.C.P.A. 1505, 1508 (C.C.P.A. 1965) 146 U.S.P.Q. (BNA) 69 and states "The certainty required in patents is not greater than that which is reasonable, having regard to the subject matter involved. Minerals Separation, Ltd. v. Hyde, 242 U.S. 261." In re Hudson, 40 C.C.P.A. 1036, 1040 (C.C.P.A. 1953)

The CAFC adopted the Supreme Court Minerals v. Hyde Enablement Statement in W.L. Gore & Associates, Inc. v. Garlock, Inc., stating:

> The district court invalidated both patents for indefiniteness because of its view that some "trial and error" would be needed to determine the "lower limits" of stretch rate above 10% per second at various temperatures above 35 degrees C. That was error. **Assuming some experimentation were needed, a patent is not invalid because of a need for experimentation. Minerals Separation, Ltd. v. Hyde, 242 U.S. 261, 270-71, 61 L. Ed. 286, 37 S. Ct. 82 (1916). A patent is invalid only when those skilled in the art are required to engage in undue experimentation to practice the invention. In re Angstadt, 537 F.2d 498, 503-04, 190 USPQ 214, 218 (CCPA 1976).** There was no evidence and the court made no finding that undue experimentation was required.
>
> W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 1557 (Fed. Cir. 1983)220 U.S.P.Q. (BNA) 303 (1983) (Emphasis added.)

**14. Section**

Appellants note that the Board's Decision at page 20 , lines 17- 20, in referring to the category of claims it has identified under Subsection II at

page 17 states (this will be referred herein as BD Category II Claims and the materials referred to as BD Category II Materials) :

> the record before us establishes that the experimentation needed to make and test the compositions under consideration is merely routine, and the Examiner does not contend otherwise

and at BD page 22 line 7, states:

> [only] limited and routine experimentation [is] necessary to make and test such materials

It has been Appellants' position throughout the prosecution of this application which is restated throughout Appellants' Brief and Appellants' Replies that only routine experimentation is needed to practice all of Appellants' claims. For example BV1 page 115, lines 11-12, in states "[t]he Examiner cites no example of a species that comes within the scope of Applicants' claims that cannot be made following Applicants' teaching." RB page25, lines 13-19, states " [i]n the present Application the Examiner has provided not [no, sic] reason for why species that come within the scope of the claims rejected for lack of enablement cannot be made and used." The Total Final Rejection or Examiner's Answer identifies none – the Board's Decision identifies none. The two passages quoted above from the Board's Decision are stated in association with the following statement from BD page 20, lines 15-20, in regards to theSubsection II category of materials.:

> The quantity of experimentation is limited to transition metal oxides in combination with only 18 rare earth and rare earth-like elements or in combination with only six alkaline earth elements

In essence the combination of these three quoted sections of the Board's Decision states that there is a finite, relatively small number of materials in the Subsection II category of materials and since only routine experimentation are necessary to make and test these material, they are

enabled. Appellants agree with this conclusion as it applies only to such materials, but not with the implication that Appellants' claims (for which the Board has not reversed the Examiner's rejections) which capture species outside of BD Subsection II Materials are note enabled.

As has been argued in details throughout the prosecution of this application and in Appellants' Brief and Appellants' Replies and as will be argued in detail below in response to the new arguments appearing for the first time in the prosecution of this application in BD pages 17-21, only routine screening is involved in finding other species including outside of BD Subsection II Materials but which come within the scope of those claim for which the board has not revered the Examiner's rejection. Collectively such species will be referred to herein as the Delta Genus. Claim for which the Board's Decision did not reverse the Examiner's rejections shall be referred to as Subsection III Claims.. Appellants note that their specifically made embodiments are species within the scope of every claim including of each Subsection III Claim. Appellants also note that the BD Subsection II Materials are a subgenus of the broadest recitation of the high $T_C$ element of the broadest claims of the Subsection III Claims. Since some of the Subsection III Claims have other limitations there is significant overlap with those. Thus the Delta Genus(s) are not directed to an invention of a different kind than the claims directed to BD Subsection II Materials. There is no evidence that species of the Delta Genus(s) cannot be made and tested in the same way as the BD Subsection II Materials which the Board's Decision has found enabled. Each Subsection III claim has within its scope a species found enabled by the Examiner and a species found enabled by the Board's Decision and there is no evidence that any of the other species cannot be made and tested following Appellants' teaching. In particular the Known Principles of Ceramic Science Claims are explicitly limited to what a person of ordinary skill in the art could make as of Appellants' earliest filing date. Appellants note, as stated in the Brief (see Examiner's Third Enablement Statement BV3 page 4) Appellants claims are

not chemical composition claims. Appellants' chemical composition claims were found anticipated over known materials which inherently had the high $T_C$ property. The Board's analysis appears to forget that important issue. (See Examiner's Second Enablement Statement VB3 pages 3- 4.)

**15. Section**

Appellants note that the Board's Decision at page 21, lines 21-24, in referring to the category of claims it has identified under Subsection II at page 17 states:

> As explained above, Appellants' Specification provides a reasonable amount of direction or guidance in identifying the compositions in question as possessing high temperature superconductive characteristics.

The implication of this statement is that the *In re Wands* factor "the amount of direction or guidance presented" necessarily requires the specific identification of species for there to be enablement. Appellants respectfully submit that this implication is an error of law.

BV1 page 21, lines 4-4, states:

> As described below no undue experimentation is needed to make such species and therefore, Applicants do not have to provide "guidance" on how to do experimentation to make such species. Guidance is only needed when undue experimentation would be needed without such guidance to make species by experiments that were not actually performed by Applicants.

BV1 Page 51, lines 9-18, states:

> Again as with the patent legal terms "predictability" and "unpredictability," the patent legal term "guidance" is directed to "the manner and process of making and using [the invention]." When the teaching of a patent application requires undue experimentation to practice the invention, guidance on how to carry out the experiment can result in enablement even though the experimentation is not recorded as a performed example in the specification. As noted in the summary of the invention section above Applicants' teaching identifies properties that Applicants' examples possess which later discovered species also possess. Thus

> Applicants' teaching has more than is minimally necessary to satisfy enablement.

BV1 page 51, 8 lines from the bottom to page 52, line 4, states:

> The Board in Ex parte Jackson 217 USPQ 804 and 807 states "a considerable amount of experimentation is permissible if it is merely routine." As stated by the Examiner the experimentation to find other species is merely routine. The Board in Ex parte Jackson goes on to state if the experimentation is not merely routine there is enablement "if the specification in question provides a reasonable [sic] amount of guidance with respect to the direction in which the experimentation should proceed to enable the determination of how to produce a desired embodiment of the invention claimed." 217 USPQ 804, 807. Thus guidance is needed when the experimentation is not merely routine. Since there is no evidence in the present application that anything other that routine experimentation is needed to determine other species, than specifically described by Applicants[sic], the guidance provided by Applicants' teaching is sufficient to satisfy enablement.

It is undisputed that the methods to make and test species that come within the scope of the claims for which the Board has not reversed the Examiner's rejection were known prior to Appellants earliest filing date. Guidance is not predicting in advance what species will work, but is guidance on how to "make and use" the claimed invention as explicitly stated in 35 USC 112, paragraph one. See the legal authority cited in Appellants' Brief and Appellants' Replies, some of which is reproduced herein, in particular in Section 13. If all species that come within the scope of a claim do not have to be foreseen in advance to satisfy enablement then the implication of the Boards' statement quoted above is legal error.

BV1 page 96, lines 19-33, state in regard to the Board's precedent Ex pare Jackson:

> The Board states at 217 USPQ 806 "The issue squarely raised by [the] rejection [of claims] is whether or not a description of several newly discovered strains of bacteria having a particularly desirable metabolic property in terms of the conventionally measured culture characteristic

> and a number of metabolic and physiological properties would enable one of ordinary skill in the relevant art to independently discover additional strains having the same specific desirable metabolic property, i.e., the production of a particular antibiotic." Thus Applicants' respectfully submit that the Board in Ex parte Jackson would find a disclosure enabling that permits "one of ordinary skill in the relevant art to independently discover additional" high Tc materials that come within the scope of Applicants' generic claims, in particular in view of the Examiners' finding that "The examiner does not deny ... that once a person of skill in the art knows of a specific type of composition which is superconducting at greater than or equal to *26K*, such a person of skill in the art, using the techniques described in the application, ... can make the known superconductive compositions." (Emphasis in the original.)

The Board's Decision is in conflict with the Board's precedent and it is thus legal error to require knowledge in advance of species that fall outside of the scope found allowable by the Board's decision but within the scope of the claims that the Board's Decision has not reversed the Examiner's rejections.

As noted above at BD page 22 line 7, the Board's Decision acknowledges referring to Subsection II Materials that "[only] limited and routine experimentation [is] necessary to make and test such materials." There is no evidence that anything other than this "limited and routine experimentation [is] necessary to make and test .materials" that fall outside the scope of the Subsection II materials, but within the scope of the materials recited as elements of he claims for which the Board's decision has not reversed the Examiner's rejections.

**16. Section**

The Board' Decision in the sentence bridging page 21-22 states

> For reasons detailed below, the art of high temperature superconductivity is generally unpredictable in that there is generally no reasonable expectation of successfully achieving high temperature superconductivity.

Appellants' disagree that "predictability" as that term is used in the patent law requires that there be a "reasonable expectation of successfully achieving high temperature superconductivity," but means within the meaning of the patent law a reasonable expectation of success in making samples for which there is a reasonable expectation of success in testing to determine if those samples have high temperature superconductivity. Appellants arrived at this position in Appellants' Brief and Appellants' Replies by a close and detailed analysis of legal authorities. The Board's Decision has not responded to that analysis nor commented on it. If all species that come within the scope of a claim do not have to be foreseen at the time of filing of an application (See legal authority cited in Section 13 above, e.g. enablement does not require inventors to predict or foresee "every conceivable and possible future embodiment of [their] invention" at the time the application is filed, as stated in *Rexnord Corp. v. Laitram Corp* (Supra),), to satisfy enablement in the context of the present application there does not have to be a reasonable expectation of foreseeing all species that have the high temperature property. Since what the Board's Decision states is equivalent to what the cited legal authority says is not necessary, the Board's statement above is legal error. The statement quoted from the Board's Decision above requires "foreseeablity" and is thus legal error,

It is Appellants' position as extensively stated in Appellants' Brief and Appellants' Replies that if species within the scope of a claims are "determinable" by experiment that only involves known methods to make the materials, known methods to test the materials and there is no evidence that species cannot be made by those methods, the genus claims to those species are enabled. It is Appellants' position that this is a predictable art because it is understood how to make and test species that are made to determine if those species have the desired property. Appellants' evidence conclusively shows this. BV1 page 46 last 15 lines to page 47, line 7, state

(This is referred to as the Poole 1988 Enablement Statement See BV3 page 6):

> Applicants have clearly shown that only routine experimentation is needed to fabricate other samples to practice Applicants' claimed invention. See the DST AFFIDAVITS (Affidavits of Shaw of 04/14/2005, Affidavit of Dinger of 04/04/2005 and Affidavit of Tsuei of 04/04/2005, Brief Attachment AM, AN and AO, respectively, collectively referred to herein as the DST AFFIDAVITS). Applicants respectfully disagree that the field of High Tc superconductivity is unpredictable within the meaning of the US patent law as suggested by the Examiner. See the affidavit of Newns submitted 04/12/2006 (Brief Attachment AP). The complex chemistry does not have to be understood to fabricate samples as stated in the book "Copper Oxide Superconductors" by Charles P. Poole, et al. (See ¶ 48 of DST AFFIDAVITS and Brief Attachment AW) which states at page 59:
>
> > [c]opper oxide superconductors with a purity sufficient to exhibit zero resistivity or to demonstrate levitation (Early) are not difficult to synthesize. We believe that this is at least partially responsible for the explosive worldwide growth in these materials.
>
> Poole further states at page 61:
>
> > [i]n this section three methods of preparation will be described, namely, the solid state, the coprecipitation, and the sol-gel techniques (Hatfi). The widely used solid-state technique permits off-the-shelf chemicals to be directly calcined into superconductors, and it requires little familiarity with the subtle physicochemical process involved in the transformation of a mixture of compounds into a superconductor.

It is undisputed that the materials that come within the scope of Appellants' claims are note difficult to synthesize and little familiarity with the chemistry going on is required. Species within the scope of Appellants' claims are readily determinable. Appellants take this to mean predictable.

*In re Wands* (Supra), *In re Angstadt* (Supra) and *Mineral Separation v. Hyde* (Supra) support Appellant's position and doe not support the Board's Decision. It is unrebutted in the persecution of the present

application that species within the scope of Appellants claims for which the Board has not reversed the Examiner's rejection reciting a superconducting element outside of the scope of a Subsection II materials are "determinable" by experiment that only involves known methods to make the materials, known methods to test the materials and that there is no evidence that these species cannot be made by those methods. The only issue appears to be whether the effort to determine them should be considered "undue experimentation." It is Appellants' position that this is not undue experimentation. Since the effort to determine whether one particular species, which can be made and tested by known methods to determine if the species has the high temperature superconductive property, is not undue, it is Appellants' position that the effort to determine whether a large number of such species in the aggregate is not undue. *In re Wands* (Supra), *In re Angstadt* (Supra) and *Mineral Separation v. Hyde* (Supra) support this view. Appellants' Brief and Appellants' Replies show why *In re Wands* supports their argument that their claims are enabled at BV1 pages 46, 47, 49, 69,83, 91, 111, 124, 125 to128, 170, 223, and 224 and RB page 52. Appellants' Brief and Appellants' Replies show why *In re Angstadt* supports their argument that their claims are enabled at t BV1, pages 46, 49, 70, 73, 74, 95, 97, 98, 101 – 108 (these pages have a comprehensive discussion of this decisions applicability to the claims rejected in the present application), 128, 135, 136, 138, 146, 152, 154, 169, 223, 224, 232 and RB pages 20, 21 and 23. Appellants' Brief and Appellants'' Replies show why *Minerals Separation, Ltd. v. Hyde Minerals Separation, Ltd. v. Hyde* supports their argument that their claims are enabled at BV1 pages 228 to 237.

*In re Wands* is directed to a biotechnology invention wherein a broad method claim was found enabled based "[o]nly nine hybridomas [that] were actually analyzed beyond the initial screening for HBsAgbinding. Of these, four produced antibodies that fell within the claims,"*In re Wands*, 858 F.2d

731, 739 (Fed. Cir. 1988)

*In re Angstadt* states "there is no magical relation between the number of representative examples and the breadth of the claims" with respect to enablement. In re Borkowski, 57 CCPA 946, 952-53, 422 F.2d 904, 910, 164 USPQ 642, 646 (1970). In re Angstadt, 537 F.2d 498, 505 (C.C.P.A. 1976)

Notwithstanding the invention in *In re Angstadt* is characterized as unpredictable a relatively small number of examples was sufficient to enable a very broad claim: "[a]lthough appellants' specification shows some 38 examples (embodiments) within the broad scope of the claims, this number is minute in comparison with the immense number of combinations of organometallic catalysts and alkylaromatic hydrocarbons within that scope. "In re Angstadt, 537 F.2d 498, 507 (C.C.P.A. 1976)

In *Mineral Separation v. Hyde* (Supra) a claim was found enabled to a method of treating ores base on a small number of examples even though "[t]he composition of ores varies infinitely." See the *Mineral Separation v. Hyde* Enablement Statement above.

The Board's Decision if applied to *In re Wands* (Supra), *In re Angstadt* (Supra) and *Mineral Separation v. Hyde* (Supra) would find the CAFC, the CCPA and the United States Supreme Court, respectively, made an error in these decisions. This is an error of law.

**17. Section**

The Board' Decision at page 26, last line to page 27 line 4 states:

> We do not share Appellants' premise that the capability of an artisan to make and test embodiments other than those allowed

> by the Examiner establishes predictability in the art of high temperature superconductivity. On this record, Appellants have not shown the asserted correlation between capability and predictability.

Appellants' have contended that the patent law term "predictable" has the meaning of determinable and has supported that by citations to legal authority. The Board's Decision does not rebut Appellants' argument and has made no comment on that argument but only has stated what is quoted in the above paragraph. In *In re Wands* Judge Newman disagrees with this comment from the Board's Decision. BV1, page 47, line 13-24, states:

> In In re Wands 858 F.2d 731, 742 (Fed. Cir. 1988); 8 U.S.P.Q.2D 1400, 1408 Judge Newman concurring in part, dissenting in part stated "[The inventor] must provide sufficient data or authority to show that his results are reasonably predictable within the scope of the claimed generic invention, based on experiment and/or scientific theory. " Thus experiment or theory is sufficient to establish predictability. And as stated above by the Examiner "a person of skill in the art, using the techniques described in the application, which included all principles of ceramic fabrication known at the time the application was initially filed, can make the known superconductive compositions." There is no requirement to know in advance all examples enabled by their teaching. Thus the field of High Tc superconductivity is predictable within the meaning of In re Wands. Species within the scope of Applicants' claims are determinable without undue experimentation and by well known testing.

Thus the statement from the Board's Decision quoted above is legal error since "predictability" can be "based on experiment and/or scientific theory" as stated by Judge Newman. The Board's Decision at BD page 27, line 3—4 states "[o]n this record, Appellants have not shown the asserted correlation between capability and predictability." Appellant's respectfully disagree, Judge Newman in the passage quoted above establishes the correlation. In addition the correlation is clearly established by the Poole 1988 Enablement Statement (See BV3 page 6), quoted above which states that little familiarity with the chemistry involved is required in making species

that come within the scope of Appellants' claims and are not difficult to synthesize.

**18. Section**

The Board's Decision at page 23, line 13 to page 24 line 10, is directed to claims 438, 440 and 536. The Board's Decision does not provide the required claim construction for the "means for conducting a superconductive current" claim element of claims 438, 440 and 536

The last paragraph of BV1 page 43 states:

> In Claims 438, 440 and 536 the "means for conducting a superconductive current" is in means plus function form. MPEP § 2181 Part II states "35 U.S.C. 112, sixth paragraph states that a claim limitation expressed in means-plus-function language 'shall be construed to cover the corresponding structure described in the specification and equivalents thereof.'"

Claims 438, 440 and 536 have been rejected under 35 U.S.C. 112,first paragraph, for lack of enablement. Appellants have appealed this rejection. The Board's Decision does not provide a construction of the limitation "means for conducting a superconductive current". The Board is required to give this means plus function limitation a construction. Without the required construction Appellants do not know what meaning the Board considers this limitation to have and thus cannot in this Request for Rehearing respond to or rebut the Board's Decision sustaining the Examiner's rejection of these claims. The Examiner in the Total Final Action and Examiner's Answer did not give this mean plus function limitation a construction. This is required. In *In re Donaldson* the CAFC states:

> the PTO was required by statute to look to [the appellant's] specification and construe the "means" language recited in the ... claim ... as limited to the corresponding structure disclosed in the specification and equivalents thereof.

In re Donaldson Co., 16 F.3d 1189, 1195 (Fed. Cir. 1994)

In *in re Feeeman* the CAFC states citing *In re Donaldson*:

> Claim construction is a question of law which we review de novo. In re Donaldson Co., Inc., 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994)

In re Freeman, 30 F.3d 1459, 1464 (Fed. Cir. 1994)

In *in re Baker Hughes* the CAFC states citing *In re Freeman*:

> claim construction by the PTO is a question of law that we review de novo, see In re Freeman, 30 F.3d 1459, 1464, 31

In re Baker Hughes Inc., 215 F.3d 1297, 1301 (Fed. Cir. 2000)

Appellants request the Board to provide its construction of the limitation "means for conducting a superconductive current" in claims 438, 440 and 536 as required by the cited decisions and to grant Appellants' request to reopen prosecution so that Appellants can properly respond to this rejection.

The only comment that the Board's Decision make in regard to claims 438, 440 and 536 is in the last paragraph of page 23 and the first paragraph of page 24. The last paragraph of the Boards' Decision at BD page 23 states in regards to Appellants' argument in the Brief "[t]his argument is based on the proposition that claims 438, 440, and 536, because of their means plus function form, have the same scope as the claims which are considered to be enabled by the Examiner," and states in the first paragraph at BD page 24 "

> This argument is unconvincing. As Appellants acknowledged during the Oral Hearing of 10 June 2009, the sixth paragraph of 35 U.S.C. § 112 requires that the means plus function language of the claims under review cover not only the corresponding structure or material described in the Specification but also the equivalents thereof whereby these claims are broader than those considered to be enabled by the Examiner *(see* Hearing Transcript 3-5). Therefore, the

> mere fact that the Examiner considers more narrow claims to be enabled is an inadequate reason to consider broader claims 438, 440, and 536 to be enabled. It follows that this argument reveals no error in the Examiner's rejection of these claims.

Under 35 U.S.C.112, paragraph 6, a means plus function element is to be construes as limited to the corresponding structure disclosed in the specification and equivalents thereof. Appellants' Brief at BV1 first paragraph stating "[t]hus since the Examiner has allowed claims to specific examples described in the specification, the claims in means plus function form can not be rejected as not being enabled and the rejection should be reversed" construed the specific examples of Appellants' specification, i.e., the claims that the Examiner allowed, to be the 112 paragraph six "corresponding structure." The Examiner did not dispute this and the Board at the oral hearing did not dispute this. The statue mandates that the clam include equivalents. The Board's Decision does not identify what the equivalents are and also why those equivalents are not enabled.. In view of the Board's Decision Appellants adopthe following new construction of the 112 paragraph six "corresponding structure" to be what the Board's Decision says is enabled at BD page 7 first paragraph, which is:

> The record of this appeal establishes that Appellants' Specification provides enabling support for the rejected claims which define the material exhibiting a superconductive state at a temperature greater than or equal to 26°K as comprising: (1) a transition metal oxide in combination with (2) a rare earth element or a rare earth-like element or a group III B element, and/or (3) an alkaline earth element or a group IIA element

The statue mandates that Appellants are entitled to this claim. Appellant do not understand how a 112 paragraph 6 equivalent cannot be enabled if the corresponding structure is enabled and the Board's Decision doe not explain this. Appellants request the Board to reverse the rejection of

claims 438, 440 and 536 with this new claim construction. If boarder claims are subsequently found enabled, Appellants' adopted that as a construction of the 112 paragraph six "corresponding structure" and request reversal of the rejection of claims 438, 440 and 536 with that broader construction.

Appellants request their Request that Prosecution be Reopened submitted concurrently herewith be granted with a statement of the Board's construction of the means plus function element ("means for conducting a superconductive current") of these claims.

**19. Section**

The Board's Decision from DB page 24, line11 to the end of the argument before the title "Conclusions of Law" at BD page 41 of the Board's Decision only mentions claim 12 in its analysis of claims for which the Board's Decision is not reversing the Examiner rejections. Appellants note that each claim has been appeal individually and arguments in BV3 are given for why each claim in enabled. The Board's Decision does not respond to the arguments

At BD page 24 the text of claim 12 is quoted. Appellants note that the claim is directed to a superconductive element that is an "superconductive oxide." Appellants note that specific embodiments reported on as having been fabricated and tested by undisputed known means are "superconductive oxides." Thus those fabricated and tested species arewithin the scope of claim 12. Appellants note that claim 329 which depends form claim 12 is one of the The Know Principles of Ceramic Science Claims. The text of this claim is

> CLAIM 329 A superconductive combination according to anyone of claims 12 to 23, 110, 131, 132 or 367-370, wherein said superconductive composition can be made according to known principles of ceramic science.

Neither the Board's Decision nor the Examiner have found this claim enabled even though it is explicitly limited to methods of fabrication know as of Appellants' earliest filing date.

**20. Section**

As noted above the Board's Decision at BD page 27, line 3—4 states "[o]n this record, Appellants have not shown the asserted correlation between capability and predictability." And as noted above Appellant's respectfully disagree, since Judge Newman in the passage quoted above establishes the correlation. In addition the correlation is clearly established by the Poole 1988 Enablement Statement (See BV3 page 6), quoted above, which states that little familiarity with the chemistry involved is required in making species that come within the scope of Appellants' claims and they are not difficult to synthesize. Immediately following the passage quote above from he Board's Decision at BD page 27, line 3—4 the Board's Decision goes on to state at BD page 27, lines 5-12:

> Moreover, this premise is contrary to the Schuller article which states:
>
> > Thus far, the existence of a totally new superconductor has proven impossible to predict from first principles. Therefore their discovery has been based largely on empirical approaches, intuition, and even serendipity. This unpredictability is at the root of the excitement that the condensed matter community displays at the discovery of a new material that is superconducting at high temperature.
> >
> > (Schuller 7)

The News Affidavit (Brief Attachment AP).address the stement in Schuller "[t]hus far, the existence of a totally new superconductor has proven impossible to predict from first principles" Appellants Brief at BV1 page 202, lines 5-11 relying on the News Affidavit states::

> Thus the statement in the Schuller article in paragraph 5 of the Newns Affidavit (Schuller Paragraph 2 above) "Thus far, the existence of, a totally new superconductor has proven impossible to predict from first principles" was shown by the work of Marvin .L. Cohen and Steven Louie published shortly after the article of Schuller also to be not totally accurate. Moreover, the highlighted section of the abstract refers to layered as a property of the materials just as Applicants' specification has identified layered as a property of high Tc superconductors. See Applicants' original claim 9.

This is unrebutted in the Board's Decision.

The Board's Decision goes on to state at BD, line 17 to page 28, line 2:

> Specifically, Appellants urge that their predictability position is supported by Schuller's reference to new superconductor discoveries as based largely on empirical approaches, intuition, and serendipity since these bases are typically used by scientists during the discovery process as evidenced by the Newns affidavit *(id.)*. However, Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists. Contrary to this proposition, we regard predictability in the context of enablement as involving a reasonable expectation of success. *See Wright,* 999 F.2d at 1564 ("Wright has failed to establish by evidence or arguments that. . . a skilled scientist would have believed reasonably that Wright's success with a particular strain of an avian RNA virus could be extrapolated with a reasonable expectation of success to other avian RNA viruses").

This passage from the Board's Decision states "Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists" as a comment on or criticism of the News Affidavit.

The following language is quoted from BV1 page 114, lines 23-27:

> The Examiner has provided no reason for why the 1.132 Declarations of Mitzi, Tsuei, Dinger and Shaw (Brief Attachments AH, AI, AJ, AK and AL) are not persuasive and the Examiner has made no comment on the DST Affidavits (Brief Attachments AM to AO) or the declaration of Bednorz (Brief Attachment AQ) or the Affidavit of Newns (Brief Attachment AQ [sic,, AP]).

Appellants' Reply states at page 5, lines 4-5, "[t]he Examiners' Answer is essentially verbatim copied from the Office Action dated 07/28/2004 and the Final Action." Thus the Examiner's Answer adds no new facts, decisions or augments not found in the Total Final Action.

Thus for the first time in the prosecution of the present application there is a comment and criticism of the News Affidavit (Brief Attachment AP). Appellants should not re required to respond in a Request fro Rehearing to comments on, criticisms of and notations of deficiencies that have been made for the first time in the Decisions on Appeal. These comments should have been made by the Examiner in prosecution and to the extent that they are being made in the Decision on Appeal, the Board is acting as an examiner and not in its appellate capacity. In view there of Appellants request that their Request to Reopen Prosecution be granted. Because the Board has introduce arguments comments on, criticisms of and notations of deficiencies in the News Affidavit (Brief Attachment AP).Appellants are compelled to introduce rebuttal comments. Attached to this rehearing is a rebuttal affidavit of Dr. News. It will be designated ATTACHEMENT BN which is next Attachment designation after the Attachment previously submitted with RB3.

**21. Section**
**Dr. News Affidavit (Attachment BN)**

Paragraph 3 of Dr, News new affidavit states:

> In my prior affidavit I commented on the USPTO response dated October 20, 2005 (Office Action) which at page 4 regarding the

subject application cites Schuller et al "A Snapshot View of High Temperature Superconductivity 2002" (report from workshop on High Temperature Superconductivity held April 5-8, 2002 in San Diego) which the examiner states "discusses both the practical applications and theoretical mechanisms relating to superconductivity."

Paragraph 4 of Dr, News new affidavit states:

As stated in paragraph 4 of my Prior Affidavit the Examiner at page 4 of the Office Action cites page 4 of Schuller et al which states:

> "Basic research in high temperature superconductivity, because the complexity of the materials, brings together expertise from materials scientists, physicists and chemists, experimentalists and theorists... It is important to realize that this field is based on complex materials and because of this materials science issues are crucial. Microstructures, crystallinity, phase variations, nonequilibrium phases, and overall structural issues play a crucial role and can strongly affect the physical properties of the materials. Moreover, it seems that to date there are no clear-cut directions for searches for new superconducting phases, as shown by the serendipitous discovery of superconductivity in $MgB_2$. Thus studies in which the nature of chemical bonding and how this arises in existing superconductors may prove to be fruitful. Of course, "enlightened" empirical searches either guided by chemical and materials intuition or systematic searches using well-defined strategies may prove to be fruitful. It is interesting to note that while empirical searches in the oxides gave rise to many superconducting systems, similar (probable?) searches after the discovery of superconductivity in $MgB_2$ have not uncovered any new superconductors."

Paragraph 5 of Dr, News new affidavit states:

As stated in paragraph 5 of my Prior Affidavit the Examiner at pages 4 -5 of the Office Action cites pages 5- 6 of Schuller et al which state:

> "The theory of high temperature superconductivity has proven to be elusive to date. This is probably as much caused by the fact that in these complex materials it is very hard to establish uniquely even the experimental phenomenology, as well as by the evolution of many competing models, which seem to address only particular aspects of the problem. The Indian story of the blind men trying to characterize the main properties of an elephant by touching various parts of its body seems to be particularly relevant. It is not even clear whether there is a single theory of superconductivity or whether various mechanisms are possible. Thus it is impossible to summarize, or even give a complete general overview of all theories of superconductivity and because of this, this report will be very limited in its theoretical scope."

Paragraph 6 of Dr, News new affidavit states:

As stated in paragraph 6 of my Prior Affidavit the Examiner at page 5 of the Office Action cites page 7 of Schuller et al which states:

> "Thus far, the existence of, a totally new superconductor has proven impossible to predict from first principles. Therefore their discovery has been based largely on empirical approaches, intuition, and. even serendipity. This unpredictability is at the root of the excitement that the condensed matter community displays at the discovery of a new material that is superconducting at high temperature."

Paragraph 7 of Dr, News new affidavit states:

My Prior Affidavit was submitted to clarify what is meant by predictability in theoretical solid state science and to comment on the passages quoted above in paragraphs 4, 5 and 6.

Paragraph 8 of Dr, News new affidavit states:

> I am submitting this affidavit to comment on certain remarks made in the Decision on Appeal of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office (Board's Decision) dated 09/17/2009."

Paragraph 9 of Dr, News new affidavit states:

> Apparently motivated by my Prior Affidavit and the arguments made by the patent applicants base on my Prior Affidavit the Board's Decision makes the following comments at page 10 in regards to a paragraph from page 7 of the Schuller article (quoted above in paragraph 6):

> > As support for the finding of unpredictability in the high temperature superconductor art, the Examiner relies on the Schuller article "A Snapshot View of High-Temperature Superconductivity 2002", which discloses:
> >
> > Thus far, the existence of a totally new superconductor has proven impossible to predict from first principles. Therefore, their discovery has been based on largely on empirical approaches, intuition, and even serendipity. This unpredictability is at the root of the excitement that the condensed matter community displays at the discovery of a new material that is superconducting at high temperature.(Schuller 7).

Paragraph 10 of Dr, News new affidavit states:

> "Boards' Decision page 26, lines 15-19, states
>
> > Appellants urge that their predictability position is supported by Schuller's reference to new superconductor discoveries as based largely on empirical approaches, intuition, and serendipity since these bases are typically used by scientists during the discovery process as evidenced by the Newns affidavit *(id.)*. However, Appellants have

> not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists.

Paragraph 11 of Dr, News new affidavit states:

> The first few sentences of paragraph 7 of my Prior Affidavit states:
>
> > I am submitting this declaration to clarify what is meant by predictability in theoretical solid state science. A theory of a solid is based on approximate mathematical formalisms to represent these interactions. A theoretical solid state scientist makes an assessment using physical intuition, mathematical estimation and experimental results as a guide to focus on features of the complex set of interactions that this assessment suggests are dominate [sic., dominant] in their effect on the physical phenomena for which the theorist is attempting to develop a theory. This process results in what is often referred to as mathematical formalism. This formalism is then applied to specific examples to determine whether the formalism produces computed results that agree with measured experimental results. This process can be considered a "theoretical experiment."

Paragraph 12 of Dr, News new affidavit states:

> "The last few sentences of paragraph 9 of my Prior Affidavit state referring as an example to a well understood theory in semiconductors :
>
> > Moreover, that a theoretical computation is a "theoretical experiment" in the conceptual sense [is] not different than a physical experiment. The theorist starting out on a computation, just as an experimentalist staring out on an experiment, has an intuitive feeling that, but does not know whether, the material studied will in fact be a semiconductor. As stated above solid state scientists, both theoretical and experimental, are initially

> guided by physical intuition based on prior experimental and theoretical work. Experiment and theory complement each other, at times one is ahead of the other in an understanding of a problem, but which one is ahead changes over time as an understanding of the physical phenomena develops.

These comments equally apple to high $T_C$ superconductivity.

Paragraph 13 of Dr, News new affidavit states:

> It is my position that the Board's Decision as quoted in paragraphs 9 and 10 above is inconsistent with what I stated in my Prior Affidavit as indicated by the representative examples from my Prior Affidavit quoted in paragraphs 11 and 12 above. I refer the complete text of my Prior Affidavit for all the details.

Paragraph 14 of Dr, News new affidavit states:

> I disagree with the Board's Decision quoted in paragraph 10 above where it states "Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists."

Paragraph 15 of Dr, News new affidavit states

> "Physical intuition" to an experimental scientist is developed from the experimental techniques and apparatus they use and the data that they measure. This is their "empirical approaches."

Paragraph 16 of Dr, News new affidavit states

> "Physical intuition" to a theoretical scientist is developed from the mathematical and calculation techniques they use (which includes numerical calculations on computers), the equations they develop and the data that they calculate. This is their empirical

approaches. Where I use empirical here as I use the term "theoretical experiment" in my Prior Affidavit.

Paragraph 17 of Dr, News new affidavit states:

Both experimental and theoretical scientists are primarily guided by this developed "physical intuition."

Paragraph 18 of Dr, News new affidavit states:

A theoretical scientist does not make random calculations and an experimental scientist does not make random experiments. Such a random approach would not result in useful results.

Paragraph 19 of Dr, News new affidavit states

When a theoretical scientist chooses to go into a particular theoretical direction or when an experimental scientist chooses to go in a particular experimental direction, that direction is guided by "physical intuition" with a reasonable expectation of success in carrying out the experiment or calculation and arriving at a measured or calculated result

Paragraph 20 of Dr, News new affidavit states:

Both theoretical and experimental scientists are primarily guided by "physical intuition" which is developed by educational training and the theoretical work or experimental work that they do.

Paragraph 21 of Dr, News new affidavit states :

When a theoretical or experimental result is achieved, that result is systematically explored to develop a fuller theoretical or experimental understanding which further develops or enhances the scientist "physical intuition."

Paragraph 22 of Dr, News new affidavit states:

> Systematic exploration to a theoretical scientist may for example include varying certain parameters used in a calculation, modifying approximate equations used in the calculation or modifying a numerical computational approach. All of this is done with a reasonable expectation of getting successfully calculated results.

Paragraph 23 of Dr, News new affidavit states:

> Systematic exploration to an experimental scientist may for example include varying certain experimental conditions, e.g. temperature, time, pressure, mix of constitutes, etc. used in an experiment in fabricating samples, modifying measurement apparatus to better measure the physical parameters, and measuring more and different physical parameters to get a fuller set of measured data . All of this done with a reasonable expectation of getting successfully fabricated samples and measured results.

Paragraph 24 of Dr, News new affidavit states

> I turn now to Schuller's use of the term "serendipity."

Paragraph 25 of Dr, News new affidavit states:

> Both experimental and theoretical scientist uses the term "serendipity." But, an experimental or theoretical observation that they make which they refer to as "serendipitous" was not a random calculation, a random fabrication of a sample or a random measurement of a sample. Both the theoretical scientist and the experimental scientist set out based on physical intuition , as I have described it above based on "physical intuition" with a reasonable expectation of success that they would successfully

make a sample, measure a sample, or perform a calculation. No reasonable scientist of ordinary scientific skill in their scientific discipline would set out on an experiment, measurement or calculation without a reasonable expectation of success. A reasonable scientist of ordinary scientific skill in a scientific discipline does not perform random and arbitrary experiments, calculations and measurements.

Paragraph 26 of Dr, News new affidavit states:

The term "serendipity" to a reasonable scientist of ordinary scientific skill in a scientific discipline means that they recognize that based on their "physical " intuition" they have chosen the correct direction out of a possibility of many directions that may not have yielded as successful a result.

Paragraph 27 of Dr, News new affidavit states

I understand Schuller's use of the term "serendipity or serendipitous" in this context.

Paragraph 28 of Dr, News new affidavit states:

Thus when Schuller in the section for the Schuller article quoted in paragraph 4 above refers to "the serendipitous discovery of superconductivity in $MgB_2$," he is using the term "serendipitous" in this context and with this meaning,

Paragraph 29 of Dr, News new affidavit states:

I note that Schuller is not an author on the paper first reporting superconductivity in $MgB_2$. The Schuller article at page 7, first paragraph, refers to reference 8 for the "discovery in 2001[8] of $MgB_2$" being a superconductor See reference 8 at page 39 of the Schuller article. Schuller is not listed as an author.

Paragraph 30 of Dr, News new affidavit states:

> The Schuller articles characterization of the discovery of superconductivity in $MgB_2$ as "serendipitous" is Schuller's statement and not that of the discoverers , i.e. the authors of the article.

Paragraph 31 of Dr, News new affidavit states

> The authors of the article reporting superconductivity in $MgB_2$ may consider it a result of their intuition and systematic study based on the work of the inventors, Bernorz and Mueller, of the above identified patent application.

Paragraph 32 of Dr, News new affidavit states:

> As I stated in paragraph 19 of my Prior Affidavit "Schuler refers the discovery of $MgB_2$ citing the paper of Nagamatsu et al. Nature Vol. 410, March 2001 in which the $MgB_2$ is reported to have a Tc of 39 K, a layered graphite crystal structure and made from powders using known ceramic processing methods. $MgB_2$ has a substantially simpler structure than the first samples reported on by Bednorz and Muller.""

Paragraph 33 of Dr, News new affidavit states:

> I also note that that $MgB_2$ was made at least as early as 1954, more than 30 years prior to Bednorz and Mueller's discovery of High $T_C$ superconductivity, as reported in the following article:

> **The Preparation and Structure of Magnesium Boride, $MgB_2$**
> Morton E. Jones and Richard E. Marsh
> J. Am. Chem. Soc.; **1954;** *76*(5) pp 1434 - 1436;

Paragraph 34 of Dr, News new affidavit states:

I also note that $MgB_2$ is layered, which is one of the properties that the Bednorz and Mueller patent application says is a property of the materials that they discovered to be high $T_C$ superconductors.

Paragraph 35 of Dr, News new affidavit states:

I also note that Mg and B are elements that are constituents of materials know to be superconductors prior to the discovery of Bernorz and Mueller.

Paragraph 36 of Dr, News new affidavit states:

Thus to the authors of the article reporting superconductivity in $MgB_2$ it may not have been "serendipitous" that a previously made material, that is layered and made of elements known to have been constituents of know superconductors, were high $T_C$ superconductors, but that their result was consistent with their intuition.

Paragraph 37 of Dr, News new affidavit states:

I will not repeat here everything that I said in my Prior Affidavit, but refer to it for the details.

Paragraph 38 of Dr, News new affidavit states:

In closing I note that the concept of a "theory" as used in solid state science or other sciences in the broadest sense refers to the "physical intuition" that scientist has about a physical phenomenon based on which the scientist forms a "phenomenological understanding" which may not be amenable to being put into an easily used form for straightforward calculation. This "phenomenological" understanding is part of the "physical intuition" that guides both the experimental and theoretical scientist to pursue a particular direction in their research. This is to be contrasted with the more specialized meaning of the term

"theory" which I will refer to as a "formal theory" which means formal analytical expressions in mathematical form based on first principles as I described in my Prior Affidavit. Experimental scientists generally do not develop or work on "formal theories" since this requires extensive training in the mathematical formalisms. Theoretical scientists generally do not perform physical experimentation since this requires extensive training in the experimental techniques. As stated above both experimental and theoretical scientists use "physical intuition" and develop and use their own form of "phenomenological theory" which is their physical understanding of a phenomenon which guides them and others working in the field in further research and development. The inventors, Bednorz and Mueller, described their physical understanding of their discovery in their publications and patent application and others used it in looking for other high $T_C$ superconductors.

**22. Section**

Dr. Newns' second affidavit (attachment BN) (News New Affidavit) addressed the Board's comments at BD page 27. News New Affidavit establishes Appellants' proposition that predictability is indicated by the use of empirical approaches and intuition in the research and discovery methodology of scientists. Moreover, News New Affidavit clarifies what the Schuller article means by "discovery ...based on serendipity" in the research and discovery methodology of scientist

**23. Section**

The Board's Decision following the statement addressed in the preceding section ( "Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the

research and discovery methodology of scientists") in the sentence bridging pagers 27 and 28 states

> Contrary to this proposition, we regard predictability in the context of enablement as involving a reasonable expectation of success. See Wright, 999 F.2d at 1564 ("Wright has failed to establish by evidence or arguments that... a skilled scientist would have believed reasonably that Wright's success with a particular strain of an avian RNA virus could be extrapolated with a reasonable expectation of success to other avian RNA viruses").

As stated in Appellants' Brief and Appellant's Replies, above in this paper and in the Newns Second Affidavit there is a reasonable expectation of success in making and testing species that come within the scope of Appellants' claim for which the Board's Decision has not reversed the Examiner's rejection This is unrebutted. Also as stated above numerous legal authority state that all species that come within the scope of a claim do not have to be foreseen or known in advance to satisfy enablement. Appellants have shown that a skilled scientist would have believed reasonably that "[Appellants'] success with ... particular [high materials in identifying them as having the high $T_C$ property] could be extrapolated with a reasonable expectation of success to other [materials]." Thus Appellants have satisfied this statement from *In re Wright.* Thus the Boards' Decision stating to the contrary is legal error.

**24. Section**

The Board's Decision states at BD page 28, line 3 -12:

> With respect to the Examiner's reliance on the "Exploring Superconductivity" article as evidencing predictability, Appellants attempt to undermine this evidence via the Bednorz affidavit of record (App. Br., vol. 5, Evidence Appendix, Attachment AQ) which addresses the Bednorz quotation in this article (App. Br., vol. 1, p. 209). Significantly, the Bednorz affidavit fails to address the article disclosure which states that "there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound" ("Exploring

> Superconductivity", last para.). The absence of such a theory supports the Examiner's unpredictability position.

As noted above in Section 20 the Total Final Rejection and the Examiner's Answer made no comment on the Bednorz Declaration (Attachment AQ).

Thus for the first time in the prosecution of the present application there is a comment and criticism of the Bednorz Declaration (Attachment AQ). Appellants should not re required to respond in a Request for Rehearing to comments on, criticisms' of and notations of deficiencies that have been made for the first time in the Decisions on Appeal. These comments should have been made by the Examiner in prosecution and to the extent that they are being made in the Decision on Appeal, the Board is acting as an examiner and not in its appellate capacity. In view there of Appellants request that their Request to Reopen Prosecution be granted. Because the Board has introduce arguments comments on, criticisms of and notations of deficiencies in the Bednorz Declaration (Attachment AQ) .Appellants are compelled to introduce rebuttal comments. Attached to this rehearing is a rebuttal declaration of Dr. Bednorz. It will be designated ATTACHEMENT BO.

. The last sentence from the Board's Decision quoted above states "[t]he absence of such a theory supports the Examiner's unpredictability position." This conclusion is an error of law. As stated above in *In re Wands* 858 F.2d 731, 742 (Fed. Cir. 1988); 8 U.S.P.Q.2D 1400, 1408 Judge Newman concurring in part, dissenting in part stated "[The inventor] must provide sufficient data or authority to show that his results are reasonably predictable within the scope of the claimed generic invention, based on experiment and/or scientific theory. " Thus experiment or theory is sufficient to establish predictability. As stated above It is undisputed that the materials that come within the scope of Appellants' claims are note difficult to synthesize and little familiarity with the chemistry going on is required. Species within the scope of Appellants' claims are readily determinable. Appellants take this to

mean predictable and to be consistent with Judge Newman's statement. Also as stated above numerous legal authority states that all species that come within the scope of a claim do not have to be foreseen or know in advance to satisfy enablement.

**25. Section**

**New Declaration of Bedrorz (Attachment BO)**

Paragraph 3 of the Bednorz Second Declaration states:

> I previously submitted a declaration date February 2, 2006. (Prior Declaration)

Paragraph 4 of the Bednorz Second Declaration states:

> In my Prior Declaration I responded to the USPTO response dated October 20, 2005 at page 7 which cites the following webpage
>
> http://www.nobelchannel.com/leamingstudio/introduction.sps?id=295&eid==0
>
> Which states
>
> > It is worth noting that there is no accepted theory to explain the high-temperature behavior of this type of compound. The BCS theory, which has proven to be a useful tool in understanding lower-temperature materials, does not adequately explain how the Cooper pairs in the new compounds hold together at such high temperatures. When Bednorz was asked how high-temperature superconductivity works, he replied, "If I could tell you, many of the theorists working on the problem would be very surprised."

Paragraph 5 of the Bednorz Second Declaration states:

> I am submitting this affidavit to comment on certain remarks made in the Decision on Appeal of the Board of Patent Appeals and

Interferences of the United States Patent and Trademark Office (Board's Decision) dated 09/17/2009.

Paragraph 6 of the Bednorz Second Declaration states:

The Board's Decision states at page 27, lines 3-10, in regards to my Prior Affidavit:

> With respect to the Examiner's reliance on the "Exploring Superconductivity" article as evidencing predictability, Appellants attempt to undermine this evidence via the Bednorz affidavit of record (App. Br., vol. 5, Evidence Appendix, Attachment AQ) which addresses the Bednorz quotation in this article (App. Br., vol. 1, p. 209). Significantly, the Bednorz affidavit fails to address the article disclosure which states that "there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound" ("Exploring Superconductivity", last para.). The absence of such a theory supports the Examiner's unpredictability position.

Paragraph 7 of the Bednorz Second Declaration states:

I respectfully disagree that I have attempted to "undermine" what I was reported to have said in the Exploring Superconductivity Article.

Paragraph 8 of the Bednorz Second Declaration states:

In the last paragraph of my Prior Declaration I declared that what I stated therein was a true statement. I reaffirm that here.

Paragraph 9 of the Bednorz Second Declaration states:

In my Prior Declaration I explain the meaning of the statement attributed to me "If I could tell you, many of the theorists working on the problem would be very surprised" in response to a

question from the interviewer about the mechanism of High $T_C$ superconductivity.

Paragraph 10 of the Bednorz Second Declaration states:

> It appears from the comment in the Board's Decision quoted in paragraph 6 above that it is not clear what the distinction is between an experimental scientist and a theoretical scientist is and how they think about the research work that they do.

Paragraph 11 of the Bednorz Second Declaration states:

> The statement attributed to me in the Exploring Superconductivity Article was to my recollection made between October 1987 and December 10 1987. I know it was before December 10, 1987 since that is when the Nobel Prize Award ceremony took place. This was shortly after my co-inventor, Alex Mueller, and I revealed our discovery.

Paragraph 12 of the Bednorz Second Declaration states:

> Since, as stated in my Prior Declaration, I am an experimental scientist, I would not have stopped my experimental work to work on developing a formal mathematical theory. To do so would have been a professional mistake. It would have required a substantial amount of in mathematical techniques that existing theoretical scientist were expert in. Moreover, by continuing my experimental work I was able to make further contributions to my experimental work.

Paragraph 13 of the Bednorz Second Declaration states:

> I disagree with the Board's Decision quoted in paragraph 6 above where it states "[s]ignificantly, the Bednorz affidavit fails to address the article disclosure which states that 'there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound' ('Exploring

Superconductivity', last para.). The absence of such a theory supports the Examiner's unpredictability position."

Paragraph 14 of the Bednorz Second Declaration states:

It is my position that the statement in the Exploring Superconductivity Article ""there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound"" as quoted in the Board's Decision is referring to a formal mathematical theory."

Paragraph 15 of the Bednorz Second Declaration states:

I expressed my physical understanding of the phenomenon that I observed in my initial papers and in my patent application.

Paragraph 16 of the Bednorz Second Declaration states:

Both experimental and theoretical scientist work by using "physical intuition.".

Paragraph 16 of the Bednorz Second Declaration states:

"Physical intuition" to an experimental scientist is developed from the experimental techniques and apparatus they use and the data that they measure. This is their "empirical approaches."

Paragraph 18 of the Bednorz Second Declaration states:

"Physical intuition" to a theoretical scientist is developed from the mathematical and calculation techniques they use (which includes numerical calculations on computers), the equations they develop and the data that they calculate. This is their empirical approaches. .

Paragraph 19 of the Bednorz Second Declaration states:

Both experimental and theoretical scientists are primarily guided by this developed "physical intuition."

Paragraph 20 of the Bednorz Second Declaration states:

A theoretical scientist does not make random calculations and an experimental scientist does not make random experiments. Such a random approach would not result in useful results.

Paragraph 21 of the Bednorz Second Declaration states:

When a theoretical scientist chooses to go into a particular theoretical direction or when an experimental scientist chooses to go in a particular experimental direction, that direction is guided by "physical intuition" with a reasonable expectation of success in carrying out the experiment or calculation and arriving at a measured or calculated result

Paragraph 22 of the Bednorz Second Declaration states:

Both theoretical and experimental scientists are primarily guided by "physical intuition" which is developed by educational training and the theoretical work or experimental work that they do.

Paragraph 23 of the Bednorz Second Declaration states:

When a theoretical or experimental result is achieved, that result is systematically explored to develop a fuller theoretical or experimental understanding which further develops or enhances the scientist "physical intuition."

Paragraph 24 of the Bednorz Second Declaration states:

Systematic exploration to a theoretical scientist may for example, include varying certain parameters used in a calculation, modifying approximate equations used in the calculation or

modifying a numerical computational approach. All of this is done with a reasonable expectation of getting successfully calculated results.

Paragraph 25 of the Bednorz Second Declaration states:

> Systematic exploration to an experimental scientist may for example include varying certain experimental conditions, e.g. temperature, time, pressure, mix of constitutes, etc. used in an experiment in fabricating samples, modifying measurement apparatus to better measure the physical parameters, and measuring more and different physical parameters to get a fuller set of measured data . All of this done with a reasonable expectation of getting successfully fabricated samples and measured results.

Paragraph 26 of the Bednorz Second Declaration states:

> In closing I note that the concept of a "theory" as used in solid state science or other sciences in the broadest sense refers to the "physical intuition" that scientist has about a physical phenomenon based on which the scientist forms a "phenomenological understanding" which may not be amenable to being put into an easily used form for straightforward calculation. This "phenomenological" understanding is part of the"physical intuition" that guides both the experimental and theoretical scientist to pursue a particular direction in their research. This is to be contrasted with the more specialized meaning of the term "theory" which I will refer to as a "formal theory" which means formal analytical expressions in mathematical form based on first principles. Experimental scientists generally do not develop or work on "formal theories" since this requires extensive training in the mathematical formalisms. Theoretical scientists generally do

not perform physical experimentation since this requires extensive training in the experimental techniques. As stated above both experimental and theoretical scientists use "physical intuition" and develop and use their own form of "phenomenological theory" which is their physical understanding of a phenomenon which guides them and others working in the field in further research and development. My co-inventor, Alex Mueller, and I described our physical understanding of our discovery in our publications and patent application and others used it as a guide in looking for other high $T_C$ superconductors.

**26. Section**

The Board's Decision states at BD page 28, line 13 -23: states:

> In summary, the Schuller article and the "Exploring Superconductivity" article support the Examiner's position that the high temperature superconductor art is unpredictable. This position also is supported by the above-noted disclosure in Appellants' Specification of compounds or compositions which fall within the compound and composition formulae of the appealed claims but which nevertheless fail to exhibit high temperature superconductivity. On the other hand, Appellants' arguments and evidence in support of their opposing view are deficient for the reasons detailed earlier. Based on the record before us, therefore, we agree with the Examiner that the art of high temperature superconductivity is unpredictable.

For the reasons given in Appellants' Brief, Appellants' Replies and in the Newns Second Affidavit, the Bednorz Second Declaration the Schuller article and the "Exploring Superconductivity" article when properly viewed from the point of view of a person of ordinary skill in that art do not support the Board's position that the high temperature superconductor art is unpredictable (in the patent law meaning) but support Appellants' position that the high temperature superconductor art is determinable . Thus the position of the Board's Decision "that the

high temperature superconductor art is unpredictable" is an error law and an error of fact..

In addition the above quoted passage from the Board's Decision states "[t]his position also is supported by the above-noted disclosure in Appellants' Specification of compounds or compositions which fall within the compound and composition formulae of the appealed claims but which nevertheless fail to exhibit high temperature superconductivity." As noted above this statement is based on an error of fact. As stated above in the last paragraph of Section 5, the sections of the Examiner's Answer referred to by the Board's Decision in the paragraph at BD page1, lines 8-12, above refers to at most two materials that are not superconductors, one of which is a previously know material that is metallic. Thus the Examiner's Answer does not show that Appellant's Specification discloses "**numerous** compounds or compositions which fall within the compositional definitions of the rejected claims" as stated by the Board's Decision quoted above. Appellants do not believe two is numerous.

In addition the above quoted passage from the Board's Decision states "Appellants' arguments and evidence in support of their opposing view are deficient for the reasons detailed earlier. Based on the record before us, therefore, we agree with the Examiner that the art of high temperature superconductivity is unpredictable." For the reasons given above Appellants disagree that their evidence is deficient. For the reasons given above the statement "the art of high temperature superconductivity is unpredictable" is an error of fact and law.

**27. Section**

The paragraph bridging pages 28 and 29 of the Board's Decision states:

> This unpredictability supports a prima facie case of non-enablement. The scope of the claims in this subsection also supports prima facie non-enablement. While

> Appellants' Specification provides reasonable guidance for the mixed transition metal oxides discussed previously, there is insufficient if any guidance in the Specification for the other materials embraced by the claims under review as correctly indicated by the Examiner *(see* Ans. 23-24). For example, the Specification provides 23 pages of disclosure concerning these mixed transition metal oxides and their constituent elements (i.e., transition metals, rare earth and rare earth-like elements, and alkaline earths) but does not provide any disclosure at all of making high temperature superconductors from any other specifically identified elements. *See Genentech,* 108 F.3d at 1366 ("[W]hen there is no disclosure of any specific starting material or any of the conditions under which a process can be carried out, undue experimentation is required"). Under these circumstances, we are unconvinced by Appellants' argument that the Examiner has failed to establish a prima facie case of non- enablement for the claims discussed in this subsection.

As stated above it is Appellants position that the Board's conclusion on unpredictability is an error of law and an error of fact. Thus it is Appellants position that the conclusion in the passage quoted above that "[t]his unpredictability supports a prima facie case of non-enablement." Is an error of law. Thus it is also Appellants position that the conclusion in the passage quoted above that "[t[he scope of the claims in this subsection also supports prima facie non-enablement" is an error of law. As stated throughout the prosecution of this application (including in BV and RB) and in this paper there is no evidence that anything more is needed thatn what is taught in Appellants' Specification to make an test species that come within the scope of Appellants' claims for which the Boards' Decision has not reversed the Examiner's rejections. This is unrebutted. It is also unrebutted that the legal authority cited by Appellants hold that all species that come within the scope of Appellants' claims do not have to be known in advance.

It is Appellants position that the following statement from the passage quoted above "[w]hile Appellants' Specification provides reasonable guidance for the mixed transition metal oxides discussed previously, there is insufficient if any guidance in the Specification for the other materials embraced by the claims under review as correctly indicated by the Examiner *(see* Ans. 23-24)." Appellants disagree. Initially the only stement from the Examiner's Answer at 23-24 relevant to this comment is "[w]hat is not a 'matter of routine experimentation' in this complex, unpredictable art is arriving at superconductive compositions outside the scope of the allowable claims." There is no evidence in the record that workers in the field made many unsuccessful attempts at making species with in the scope of the claims for which the board's Decision has not reversed the Examiner's rejections. It is undisputed that the materials that come within the scope of Appellants' claims are note difficult to synthesize and little familiarity with the chemistry going on is required. Thus the Examiner's statement from the Examiner's Answer is not supported by any facts and the Board's reliance on it in the Board's Decision is an error of law. There is no evidence in the record that a person of ordinary skill in the art has to engage in undue experimentation to make and test species for the high temperature superconductor property within the scope of the claim for which the Board Decision has not reversed the Examiner's rejections. Every one of these claims includes within their scope species made and tested by Appellants and reported on in their Specification. The Subsection Iii materials that the Board's Decision has stated are not enabled includes species that come within the scope of these claims *In re Wands* supports Appellants position. *In re Wands* states "[e]nablement is not precluded by the necessity for some experimentation such as routine screening"" In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988) All that is involved in finding species not explicitly described in Appellants' specification is making them by routine methods and testing them by

routine methods – this is routine screening that *In re Wands* states is sufficient to support enablement. *In re Wands* further states quoting from *Ex parte Jackson*:

> The determination of what constitutes undue experimentation in a given case requires the application of a standard of reasonableness, having due regard for the nature of the invention and the state of the art. Ansul Co. v. Uniroyal, Inc. [448 F.2d 872, 878-79; 169 USPQ 759, 762-63 (2d Cir. 1971), cert. denied, 404 U.S. 1018, 30 L. Ed. 2d 666, 92 S. Ct. 680 (1972)]. The test is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed
>
> In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988)

This quote from *In re Wands* includes the following quotation from *Ex parte Jackson* "[t]he test is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, **or** if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed." (Emphasis added.) It is undisputed in the present appeal that the experimentation to determine other species of high $T_C$ materials within the scope of the claims is what was know prior to Appellants' earliest filing date which is thus routine. Thus following *In re Wands* a considerable amount of this type of experimentation is permissible. Appellants note that the passage quoted above from *In re Wands* states that a "considerable amount" of "routine" experimentation **or** "reasonable guidance with respect to the direction in which the experimentation should proceed" is needed to satisfy enablement **but not both** routine experimentation and reasonable guidance is needed.

The paragraph quoted above from the Board's Decision states "Appellants' Specification provides reasonable guidance for the mixed transition metal oxides discussed previously, there is insufficient if any guidance in the Specification for the other materials embraced by the claims

under review .... For example, the Specification provides 23 pages of disclosure concerning these mixed transition metal oxides and their constituent elements." As stated above these 23 pages contain species within the scope of the claims for which the Board's Decision had not revered the Examiner's rejections. As *In re Wands* states guidance of the type the Board's Decision appears to state is necessary is in fact not necessary since the experimentation required is only routine. This stement of the Board's Decision that it is necessary is an error of law. It is also in conflict with the many decisions (legal authority) cited in Appellants'' Brief and Appellants' Replies that all species do not have to be know in advance and is thus an error of law.

The paragraph quoted above from the Board's Decision states in regard to the 23 pages of "disclosure concerning these mixed transition metal oxides and their constituent elements (i.e., transition metals, rare earth and rare earth-like elements, and alkaline earths) but does not provide any disclosure at all of making high temperature superconductors from any other specifically identified elements. *See Genentech,* 108 F.3d at 1366 ("[W]hen there is no disclosure of any specific starting material or any of the conditions under which a process can be carried out, undue experimentation is required")." As pointed out above in *Genentech* there was no enabled species at all that came within the scope of the claim being reviewed for enablement. The passage quoted by the Board's Decision from *Genentech* is directed to this situation, that is there is a total failure to enable anything which came within the scope of the *Genentech* claim. That is not the situation here. Every claim for which the Board's Decision did not reverse the Examiner's rejection includes within its scope enabled species (either found enabled by the Examiner or by the Board's Decision.). The Board is applying *Genentech* in a way not intended by this decision. Therefore, the manner in which the Board's Decision is applying *Genentech* against Appellants' claims is legal error. What the Board's Decision is stating, if not explicitly, at least implicitly, is that even though a

claim, such as claim 12 (or any of the other claims for which the Board's Decision did not reverse the Examiner's rejection,) includes within its scope what the Board's Decision has found enabled subject mater, subject matter outside of that range within this claim, is not enabled because "there is no disclosure of any specific starting material or any of the conditions under which a process can be carried out." What the Board's Decision is stating here is that all species that come within the scope of such a claims must be known in advance. How else would one know what the starting material would be except if you know what the species is in advance. This is in conflict with the legal authority cited by Appellant that states such species do not have to be known in advance. Enablement does not require inventors to predict or foresee "every conceivable and possible future embodiment of [their] invention" at the time the application is filed, as stated in *Rexnord Corp. v. Laitram Corp* (Supra). This is only one decision supporting this proposition. Thus the application of *Genentech* in the Board's Decision is legal error. In the passage quoted by the Board's Decision from *Genentech* the conclusion "undue experimentation is required" again applies when there is no species that comes within the scope of the claim that isunder review. What *Genentech* is saying is if there is no species that is enabled that comes within the scope of the claim under review, there is merely a concept disclosed of what is being asserted as a "new, useful and not obvious" invention, but there is not disclosure of how to make and use it as required under 35 USC 112, first paragraph.. This means that undue experimentation is needed to figure out an enabled embodiment which is how to make and usethe claim under review. In contradistinction, when there is taught in the specification enabled species that come within the scope of the claim, other embodiments that are made and used in the same way are enabled if they can be determined without undue experimentation.

Thus the conclusion in the paragraph quoted above form the Board' Decision "[u]nder these circumstances, we are unconvinced by Appellants'

argument that the Examiner has failed to establish a prima facie case of non- enablement for the claims discussed in this subsection" is an error of law. The Board's Decision does not make a prima facie case of lack of enablement since it does not cite any evidence that persons of ordinary skill in the art had or have any difficulty making such species.

**28. Section**

The paragraph bridging pages 29 and 30 of the Board's Decision states:

> As rebuttal to a prima facie case of non-enablement, Appellants argue that they "have shown extensive evidence that persons of skill in the art can determine species within the scope of [the claims in this subsection] without undue experimentation" (App. Br., vol. 3, p. 35; *see generally* App. Br., vol. 3, pts. 1-8). These arguments and evidence are unpersuasive for two fundamental reasons. First, they do not carry Appellants' burden of showing enablement with respect to "the full scope of the claimed invention" as defined by the claims under consideration. *Wright,* 999 F.2d at 1561. Second, Appellants' arguments and evidence that these claims are enabled inappropriately rely on the knowledge and skill of the artisan, whereas "[i]t is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement". *Genentech,* 108 F.3d at 1366. The following discussion is a more detailed exposition of the deficiencies of Appellants' arguments and evidence.

Appellants disagree with the statement that they have not carried their "burden of showing enablement with respect to 'the full scope of the claimed invention' as defined by the claims under consideration." Initially Appellants do not agree that the burden has shifted to them

BV1 page 102, lines 7-15 state

In re Angstadt further states at 190 USPQ 219:

> We note that the PTO has the burden of giving reasons, supported by the record as a whole, why the specification is not enabling. In re Armbruster, 512 F.2d 676, 185 USPQ 152

> (CCPA 1975). Showing that the disclosure entails undue experimentation is part of the PTO's initial burden under Armbruster; this court has never held that evidence of the necessity for *any* experimentation, however slight, is sufficient to require the applicant to prove that the type and amount of experimentation needed is not undue.

Appellants do not believe that the burden has shifted to them since the Board's Decision has not shown that persons of ordinary skill in the art cannot make species that come within the full scope of the claim for which the board has not reversed the Examiner's rejections and Appellants are not required to know in advance all species that come within the scope of their claims. Even if the burden has shifted to Appellants, Appellants evidence shows that persons of skill in the art can make and test the species that come within the scope of their claims using only what is disclosed in their specification. Appellants do not have to know at the time of filing their application all species that come within the scope of their claims when they can be determined without undue extermination as is the case here.

Appellants note that in the passage quoted above the Boards' Decision states "Appellants' burden of showing enablement with respect to 'the full scope of the claimed invention' as defined by the claims under consideration. *Wright,* 999 F.2d at 1561." As stated above in *In re Wright* there was a single embodiment and there was evidence that years after the Wright application was filed there was difficulty practicing the invention. There is no such evidence in the present application. The full text containing the language "'the full scope of the claimed invention" is

> Although not explicitly stated in section 112 to be enabling, the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without "undue experimentation." Vaeck, 947 F.2d at 495, 20 USPQ2d at 1444; Wands, 858 F.2d at 736-37, 8 USPQ2d at 1404; In re Fisher, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970) (the first paragraph of section 112 requires that the scope of protection sought in a claim bear a reasonable correlation to the scope of enablement provided by the specification). Nothing more than objective enablement is required, and therefore it is

> irrelevant whether this teaching is provided through broad terminology or illustrative examples. In re Marzocchi, 439 F.2d 220, 223, 169 USPQ 367, 369 (CCPA 1971).

In re Wright, 999 F.2d 1557, 1561 (Fed. Cir. 1993)

As stated many times species can be made and tested by known methods. Thus only routine screening is involved and thus there is no undue experimentation involved to practice the full scope of the claimed invention. Appellants have used objective enablement based on "broad terminology or illustrative examples." "[n]othing more... is required"

Appellants disagree with this statement from the passage quoted above that

> Appellants' arguments and evidence that these claims are enabled inappropriately rely on the knowledge and skill of the artisan, whereas "[i]t is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement". *Genentech*, 108 F.3d at 1366.

Appellants disagree that they rely for enablement on "the knowledge and skill of the artisan." Appellants' Specification teaches method of making and testing species. It is unrebutted that those methods can be used to make a test species that come within the scope of the claims for which the Board's Decision had not reverse the Examiner's rejection and wherein the superconducting element falls outside of the Subsection II Materials. Thus Appellants' are not relying on the knowledge of the skill in the art as suggested by the Board's Decision. The Board's Decision relies on this stement from *Genentech* "[i]t is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement". As stated above this applies to the situation where there is no enabled species that comes within the scope of the claim under review. That is, a patent application cannot be directed to a "novel" concept only relying on persons of skill in the art knowing how to

implement the "novel" concept of the claimed invention. That is not the case for the claims under appeal, including the Subsection III claims, in the present application. As stated above every claim under appeal include within their scope species found enabled by the Examiner or the Board's Decision. For example, if a claim has two elements A and B where A is old and B is new or novel, it is necessary for the patent application to describe how to make B. The patent application cannot rely on what is known to a person of skill in the art to make B but can rely on what is know to a person of skill in the art to make A. In the present application some of the superconducting elements will be made of old materials. Only routine (old) testing needs to be done to screen for them or to determine if they have the desired superconducting property. Others will have to be made by the (old) known principles and tested by the old routine testing described in Appellants' Specification to determine if they have the high temperature superconducting property. This analysis is supported by *Genentech* which states

> a specification need not disclose what is well known in the art. See, e.g., Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1385, 231 U.S.P.Q. (BNA) 81, 94 (Fed. Cir. 1986). However, that general, oft-repeated statement is merely a rule of supplementation, not a substitute for a basic enabling disclosure.
>
> Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1366 (Fed. Cir. 1997)

The novel aspect of the present invention is not the method of making the materials, not the method of testing the materials and not the materials. The novel aspect is having a $T_C$ greater than or equal to 26 K. For example, the Schuller article refers to $MgB_2$ which was made more than 30 years before Appellants' discovery. It just had to be tested by methods known since 1911.

Appellants note that the Board's Decision relies on the statement "[i]t is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement". *Genentech,* 108 F.3d at 1366, but does not identify what the Board considers to be the novel aspect. It is not possible for Appellant to respond without knowing what the Board considers to be the novel aspect. Appellants request that the Board grant Appellants' request to reopen prosecution and state what the Board considers the novel aspect to be.

**29. Section**

The Board Decision at page 30, line 6-13, are directed to the "Examiner's first enablement Statement." BD page 30, lines 6—13 states

> The First Statement involves the Examiner's acknowledgement that artisans using known principles of ceramic fabrication would be able to make known superconductive compositions. However, the claims under review are not limited to ceramic compositions (i.e., compositions which can be made using known principles of ceramic fabrication). More importantly, it is Appellants' Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement. *Genentech,* 108 F.3d at 1366.

As stated above Appellants note the Board's Decision does not identify what the Board considers the novel aspect of Appellants' invention to be. Thus Appellants cannot adequately respond to the board's comments and in view thereof as requested above Appellants request the Prosecution be reopened. The CAFC clarified *Genentech* stating:

> Our ruling in Genentech, Inc. v. Novo Nordisk, A/S, 108 F.3d 1361 (Fed. Cir. 1997), is not to the contrary. Although extrinsic evidence cannot be used to supplement a non-enabling specification, such evidence can shed light on whether the specification is itself enabling.

Pharm. Res., Inc. v. Roxane Labs., Inc., 253 Fed. Appx. 26, 31 (Fed. Cir. 2007)

Thus extrinsic evidence can be used to show that the specification is enabling. The extensive evidence Appellants have submitted in the prosecution of their application is just for this purpose, that is to show that a very large variety of materials can be made by the methods described in their Specification. This is unrebutted. This extensive evidence has not been used to supply missing information necessary to made the "novel" aspect.

The passage quoted above from the Board's Decision states "the claims under review are not limited to ceramic compositions (i.e., compositions which can be made using known principles of ceramic fabrication)." Appellants respectfully disagree. The following claims recite that the high Tc element of the claims from which these claims depend "can be made according to known principles of ceramic science" or similar recitation: dependent claims 322 to 360, 414 to 427, 436, 453 to 465, 473 to 475, and 484 to 491 and independent claim 522. Of these claims the following are allowed by the Examiner: 330, 335, 336, 346 and 358. Most of the dependent claims are in multiple dependent form. The Board's Decisions reversed the Examiner's rejection of parts of the these multiple dependent claims. Others remain with the Examiner's rejections not reversed.

In addition,

- independent claims 59 is directed to "**a ceramic like material**" and

- independent claim 374 is directed to "**a material comprising a ceramic characteristic.**".

Dependent claim 351 depends from claim 59 and states that the **"ceramic like material" "can be made according to known principles of ceramic science."**

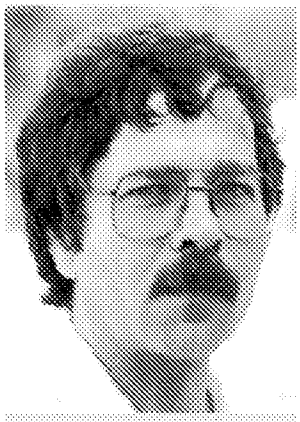
Dependent claim 419 depends from claim 374 and states that the "**the material comprising a ceramic characteristic**" "**can be made according to known principles of ceramic science.**"

Some of these claims are listed below.

Appellants note that at this web address of the Nobel Prize website http://nobelprize.org/nobel_prizes/physics/laureates/1987/ the following announcement of Appellants award of the 1987 Nobel Prize can be found.

The Nobel Prize in Physics 1987

"for their important break-through in the discovery of superconductivity in ceramic materials"



J. Georg Bednorz

K. Alexander Müller

The Nobel Prize in Physics 1987

"for their important break-through in the discovery of superconductivity in ceramic materials"

This states that the 1987 Nobel Prize was awarded to Appellants "for their important break-through in the discovery of superconductivity in ceramic material." The Board's Decision does not find enabled a claim commensurate in scope with the contribution for which they were awarded the Nobel Prize.

CLAIM 59 A combination, comprised of:

**a ceramic-like material** having an onset of superconductivity at an onset temperature greater than or equal to 26°K,

means for passing a superconducting electrical current through said ceramic-like material while said material is maintained at a temperature greater than or equal to 26°K and less than said onset temperature, and

means for cooling said superconducting ceramic-like material to a superconductive state at a temperature greater than or equal to 26°K and less than said onset temperature, said material being superconductive at temperatures below said onset temperature and a ceramic at temperatures above said onset temperature.

CLAIM 351 A **combination according to claim 59, wherein said ceramic-like material can be made according to known principles of ceramic science.**

♦

CLAIM 374 A combination, comprised of:

**a material comprising a ceramic characteristic** comprising an onset of superconductivity at an onset temperature greater than or equal to 26°K,

means for passing a superconducting electrical current through said material comprising a ceramic characteristic while said material is maintained at a temperature greater than or equal to 26°K and less than said onset temperature, and

means for cooling said superconducting material having a ceramic characteristic to a superconductive state at a temperature greater than or equal to 26°K and less than said onset temperature, said material being superconductive at temperatures below said onset temperature and a ceramic at temperatures above said onset temperature.

CLAIM 419 A combination according to claim 374, wherein **said material can be made by known principles of ceramic science.**

♦

CLAIM 522 An apparatus comprising:

a superconductive current carrying element comprising a $T_c$ greater than or equal to 26 °K

**said superconductive current carrying element comprises a composition that can be made according to known principles of ceramic science**.

♦

CLAIM 438 An apparatus comprising: a means for conducting a superconducting current at a temperature greater than or equal to 26°K and a means for providing an electric current to flow in said means for conducting a superconducting current.

CLAIM 453 An apparatus according to anyone of claims **438**, 439 or 440, **wherein said means for conducting a superconducting current can be made according to known principles of ceramic science.**

**30. Section**

The Boards' Denison at page 30, lines 14-23 is directed to the Examiner's Second Enablement Statement. The Boards Decision state at page 30,lines 20-23

> Contrary to Appellants' presumption, a reference such as the Asahi Shibum article need not be enabled in order to qualify as prior art for the purpose of determining obviousness under § 103. *Symbol Techs., Inc. v. Opticom, Inc.*, 935 F.2d 1569, 1578 (Fed. Cir. 1991).

Appellants do not disagree with this statement since it is consistent with what Appellants stated. For the Asahi Shibum article to render Appellants' claims obvious even if it is not enabling itself a person of ordinary skill in the art must be able to practice the invention that is considered obvious. The missing information must come from some where else such as other documents or from what is know to a person of skill in the art. The Examiner rejected the claim over the Asahi Shibum Article alone. Thus it was and still is the Examiner's view that nothing more than knowing that a material was discovered having the high $T_C$ property was sufficient for a person of skill in the art to practice Appellants' claimed invention to their full scope. The Boards Decision agrees with Appellants. Once the "novelaspect" - the high $T_C$ property – was disclosed every person of skill in the art knew how to make more of them. Thus the Board's Decision agrees with Appellants that how to make and test species was sufficient to find all other high $T_C$ materials. without providing more information than is contained in Appellants' Specification. This is what Appellant said at BV1 page 158, first sentence of the last paragraph "Thus in the Office Action of 7-30-98, the Examiner is effectively stating that everything within Applicants' non-allowed claims rejected under 35 USC 103 over the Asahi Shinbum article alone can be practiced by a person of skill in the art with what is taught in the Asahi Shinbum article in combination with what is known to a person of skill in the art." Something which is obvious cannot be not enabled at the same time. The Board's Decision agrees with this. The

United States Supreme Court agrees with this in Loom v Higgins. See BV1 page 238.

**31. Section**

The Board's Decision in the paragraph bridging pages 30 and 31 is directed to the Examiner's Third Enablement Statement. Appellants disagree with the Board's statement that they see no merit in this argument. The Schuller Article refers to $MgB_2$ which was made more than 30 years prior to Appellants' discovery. Its high $T_C$ property is inherent. . There is nothing novel about making it ant testing it. Thus persons or ordinary skill in that art are enabled to make and test it. From the Shuller article it was found to have the high $T_C$ property motivated by Appellants discovery. It has a layered structure, an attribute taught by Appellants' specification. This is similar to the reasons identified under the Examiner's Third Enablement Statement that Appellant was denied claims to the chemical compositions disclosed in their Specification that is they were enabled by prior art structures identified by the Examiner.

**32. Section**

The Boards' Decision at page 31, lines 9 to page 32 line 2, is directed to the Fourth Enablement Statement. BD paragraph bridging pages 31 and 32 states in regards to the Examiner's Fourth Enablement Statement:

> We do not agree with Appellants that the Examiner's statement constitutes the above-quoted acknowledgement. Further, we do not agree with Appellants that the mere capability to make and test compositions encompassed by the claims under review satisfies the enablement requirement. Rather, enablement requires the Specification to teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation wherein it is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement. *Genentech,* 108 F.3d at 1365-1366.

Appellants disagree with this statement. Appellants respectfully summit it is an error of law. The Examiners Fourth Enablement Statement acknowledges that persons of skill in the art know how to control the materials they fabricate through their acknowledged high level of skill to, as stated in the Schuller Enablemetn Statement, systematically fabricate and test materials to determine without undue experimentation whether they have the desires high $T_C$ property. According to the CAFC in *In re Wands* (BV1 pages 125-128), the CCPA in *In re Angstadt* (BV1 pages 76-80), and the United States Supreme Court in *Mineral Separation v. Hyde*(BV1 pages 228-237) the routine screening satisfies the enablement requirement. This is the controlling precedent. As stated above the manner in which the Board's Decision is applying *Genentech* is an error of law. As stated above the Board's Decision does not identify what it considers to be the "novel aspect" of Appellants claims. Appellants therefore cannot properly respond to this comment. Appellants are not relying on knowledge of persons of skill in the art for the novel aspect (as defined above by Appellants) of their invention and as stated above there is no evidence that undue experimentation is needed to practice the full scoop of their claims

**33. Section**

The Board's Decision at BD page 32, lines 5-11, comments on the Pool 1988 Enablement Statement. (BV3 pages 6-8). The Poole 1988 Enablement statement is independent corroboration of the truth of the teaching of Appellants' Specification. The implication of Board's Decision is that Appellant is relying on Poole 1988 to supply novel aspect of Appellants' claimed invention. This is an error of fact. Since the Board's Decision does not define what it means by this, the Board's Decision is inconclusive. It is Appellants' position that the statement of the Board' Decision "[as] explained earlier, the capability of an artisan to fabricate such materials is by itself inadequate to establish enablement" is for the reasons given above an error or law. This statement implicitly requires the all species that come

within the scope of a claim must be known in advance for a claim to be enabled. This is an error of law. Appellants have cited numerous decisions (legal authority) that clearly state that all species that come within the scope of a claim doe not have to be foreseen to satisfy enablement. If is Appellants' position that the statement of the Board's Decision "this capability relates to the knowledge and skill of an artisan rather than to the requirement that a Specification supply the novel aspects of a claimed invention in order to provide enablement. *Genentech,* 108 F.3d at 1366" As applied in the Board's Decision Is an error or law Again the Board's Decision does not define what it means as the "novel aspect" of Appellants' claimed invention. Thus this stement is an error of fact, inconclusive. and an error of law.

**34. Section**

The Board's Decision at BD page 32, lines 12 to page 33, line 3-11, comments on the Pool 1995 Enablement Statement and the Poole 1996 Enablement Statement Enablement Statement (BV3 pages 6-8) which states:

> The Poole 1995 and 1996 enablement statements involve confirmation that high temperature superconductors possess characteristics disclosed in Appellants' Specification such as metallic, perovskite-like, mixed-valence, and layered structure characteristics. While it is true that the Specification associates these characteristics with Appellants' invention of mixed transition metal oxide superconductors, the Specification also associates these same characteristics with prior art superconductors. See the Background Art section of the Specification wherein prior art superconductors are described as metallic (Spec. para, bridging 1-2), perovskite-like (Spec. para, bridging 3-4) which includes a layered structure, and mixed-valence *(id.).* We do not see and Appellants do not explain why enablement is evidenced by the fact that the same characteristics are exhibited by superconductors known in the prior art and the superconductors discovered by Appellants. In any event, we again remind Appellants that it is the Specification, not the knowledge of one skilled in the art, that must

> supply the novel aspects of an invention in order to constitute enablement. *Genentech,* 108 F.3d at 1366.

In the paragraph quoted above the Board's Decision states "[w]e do not see and Appellants do not explain why enablement is evidenced by the fact that the same characteristics are exhibited by superconductors known in the prior art and the superconductors discovered by Appellants." Appellants have not provided the referenced explanation since this has never been made an issue in the prosecution of this application. For the first time this is being raised in the Board's Decision. Appellant should not be required to respond to such a question in a Request for Rehearing. Appellants request that the Request to Reopen Prosecution be granted so that new factual inquiries and questions such as these can be properly responded to during prosecution. Enablement is evidenced by the fact that the same, similar or related characteristics are exhibited by superconductors known in the prior art and the superconductors discovered by Appellants because this shows that the behavior of the materials either superconductive or not superconductive are understood and their behavior is thus predictable and determinable. This is what establishes or evidences enablement. This also evinces or established how species are selected to make and test for the desired high $T_C$ property. The quoted passage above again quotes "[i]n any event, we again remind Appellants that it is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute enablement. *Genentech,* 108 F.3d at 1366. The full citation from *Genentech* is

> the omission of minor details does not cause a specification to fail to meet the enablement requirement. However, when there is no disclosure of any specific starting material or of any of the conditions under which a process can be carried out, undue experimentation is required; there is a failure to meet the enablement requirement that cannot be rectified by asserting

> that all the disclosure related to the process is within the skill of the art. It is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement. This specification provides only a starting point, a direction for further research.
>
> Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1366 (Fed. Cir. 1997)

The Board's Decision repeatedly quotes the same passage leaving out "when there is no disclosure of any specific starting material or of any of the conditions under which a process can be carried out, undue experimentation is required." *Genentech* does not state that this disclosure in the specification is required for every species that could come within the scope of the claim in order to establish enablement. This is the way the Board's Decision is applying this language. This is legal error. . In *Genentech* there was no species that came within the scope of the claim under review that satisfied this language. As stated above for every claim for which the Board's Decision has not reversed the Examiner's rejection there is disclosure of specific starting materials and of the conditions under which a process can be carried out. Other species are determined by routine methods. Thus there is no undue experimentation required."

**35. Section**

The Board's Decision at BD page 33, lines 4-9, comments on the Schuller Enablement Statement (BV3 pages 8-9) and the Poole 1996 Enablement Statement Enablement Statement which states:

> Appellants also rely on the so-called Schuller enablement statement as evidence of enablement (App. Br., vol. 3, p. 8-9). This statement concerns Schuller's above-discussed disclosure that the process of superconductor discovery includes, for example, the use of intuition. We have previously explained why this disclosure does not establish predictability in the high temperature superconductor art. For analogous

> reasons, Schuller's disclosure fails to evince enablement for the claims in this subsection.

As stated above Appellants submitted the Affidavit of Newns (Brief Attachment AP) to comment on the Schuller Article. the Examiner made no comments on he Affidavit of Newns (Brief Attachment AP). Specifically the Examiner did not state "Schuller's disclosure fails to evince enablement" for any of the claims This new reason for rejection is being made for the first time in the Board's Decision. Appellants request that the Board grant Appellants' Request to Reopen prosecution so that Appellants will have the proper opportunity to respond in prosecution and so that they will not be require to respond to this new argument for the first time in a Request for Rehearing. Appellants have submitted herewith the Second Affidavit of Newns to explain "intuition" as described above.

**36. Section**

The Board's Decision at BD page 33, line 10 to page 34, line 3, comments on Appellants additionally relying on the affidavits of record by Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns, and Bednorz *(See* App. Br., vol. 5, Evidence Appendix, Attachments AH to AR). BD page 33, line 13 to page 34, line3, states:

> The Newns and Bednorz affidavits do not support Appellants' enablement position for the same previously-given reasons that they do not support Appellants' predictability position. The remaining affidavits share common deficiencies. The Shaw affidavit (App. Br., vol. 5, Evidence Appendix, Attachment AM) is illustrative. In this affidavit, Shaw states that persons of ordinary skill in this art are capable of fabricating ceramic materials exhibiting high temperature superconductivity by using principles of ceramic fabrication known in the prior art *(see* e.g., paras. 8, 11, 49, 50). Such statements do not evince enablement for reasons explained earlier. That is, all the claims under consideration are not limited to high temperature superconductive ceramic materials. Moreover, it is the Specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to

> constitute adequate enablement. *Genentech,* 108 F.3d at 1366. The affidavits relied upon by Appellants do not explain how the Specification supplies novel aspects of Appellants' invention to thereby enable the full scope of the claims under consideration.

As stated above the Examiner during prosecution, in the total Final Action, or the Examiner's Answer made no comment the Affidavits of Tsui, Dinger and Shaw (Brief Attachments AM, AN and AO) or on the Affidavit of Newns (Brief Attachment AP) of on the Declaration of Bednorz (Brief Attachment AQ). . The passage quoted above from the Board's Decision states: "[t]he Newns and Bednorz affidavits do not support Appellants' enablement position for the same previously-given reasons that they do not support Appellants' predictability position." Appellants disagree for the same reasons given in response to the new reasons given in the Board's predictability position. This comment is made for the first time in the prosecution of this application in the Board's Decision. The Examiner made no comment at all on these affidavits. Appellant request that their Request to Reopen Prosecution be granted, so that they can properly respond to these comments in prosecution. Appellants should not be required for the first time to respond to such comments in a Request for Rehearing. The passage quoted above states "[t]he remaining affidavits share common deficiencies. The Shaw affidavit .. is illustrative. In this affidavit, Shaw states that persons of ordinary skill in this art are capable of fabricating ceramic materials exhibiting high temperature superconductivity by using principles of ceramic fabrication known in the prior art ..Such statements do not evince enablement for reasons explained earlier. That is, all the claims under consideration are not limited to high temperature superconductive ceramic materials." This comment is made for the first time in the prosecution of this application in the Board's Decision. The Examiner made no comment at all on these affidavits. Appellants request that

their Request to Reopen Prosecution be granted so that they can properly respond to these comments in prosecution. Appellants should not be required for the firs time to respond to such comments in a Request for Rehearing.

Appellants note (see Initial Comments at page 2 at the beginning of this paper) the following claims recite that the high $T_C$ element of the claims from which these claims depend "can be made according to known principles of ceramic science" or similar recitation: dependent claims 322 to 360, 414 to 427, 436, 453 to 465, 473 to 475, and 484 to 491 and independent claim 522. In addition,

- independent claims 59 is directed to "**a ceramic like material**" and

- independent claim 374 is directed to "**a material comprising a ceramic characteristic.**".

In the passage quote above the Board's Decision again states "it is the Specification, not the knowledge of one skilled in the art that must supply the novel aspects of an invention in order to constitute adequate enablement. *Genentech,* 108 F.3d at 1366." As noted above the way in which the Board's Decision applies *Genentech,* in particular the specifically cited passage is an error of law.

In the passage quote above the Board's Decision states "[t]he affidavits relied upon by Appellants do not explain how the Specification supplies novel aspects of Appellants' invention to thereby enable the full scope of the claims under consideration." Appellants note the Examiner never raise d this issue in prosecution, the Total Final Action or in the Examiner's Answer. This issue is being raised for the first time in the Board's Decision. Appellants request that their Request to Reopen Prosecution be granted so that they can properly respond to these comments in prosecution.

Appellants should not be required for the first time to respond to such comments in a Request for Rehearing. Moreover, the Board's Decision does not define what it means by the "novel aspect.' Thus Appellants cannot respond to this comment. Appellants request the Board to grant Appellants Request to Reopen Prosecution and provide a construction of the "novel aspect" so that Appellants can respond to this comment. If the Examiner did not ask for this in prosecution then the Examiner did not make a prima facie showing of lack of enablement. To the extent that this is being asserted for the first time and it is required then a prima facie showing is being made for the first time by the Board's Decision. Appellants explained above what they believe is the novel aspect, that is that material have a $T_C$ grate than or equal to 26 K. Such material can be made and tested according to the teaching of Appellants' Specification to the full scope of the claims. .This is not disputed. Thus Appellants' claims are enabled to their full scope.

**37. Section**

. The Board's Decision at page 34 lines 4-15, states:

> In light of the foregoing, the arguments and evidence presented by Appellants in this appeal have little if any value in establishing that, on the original application filing date of 22 May 1987, a skilled scientist in this art would have believed reasonably that Appellants' high temperature superconductivity success with the mixed transition metal oxide materials discussed above could be extrapolated with a reasonable expectation of success to other materials. *See Wright,* 999 F.2d at 1564 ("Wright has failed to establish by evidence or arguments that, in February of 1983, a skilled scientist would have believed reasonably that Wright's success with a particular strain of avian RNA virus could be extrapolated with a reasonable expectation of success to other avian RNA viruses").

Appellants disagree with is conclusion. As stated above in *In re Wright* only one example was disclosed and there was evidence that years after Wrights

invention persons of skill in the art were haring difficulty making other species. As stated above there is no such evidence in the present Application. There is no example of a high $T_C$ superconductor that cannot be made and tested following the teaching of Appellants' Specification to determine if the species has the desired property. It is undisputed that persons of ordinary skill in the art had a reasonable expectation of success of making and testing species. This art is well understood and the many legal authorities cited in Appellants' Brief and Appellant's Replies clearly state that all known species that come within the scope of a claim do no have to be know in advance. Enablement does not require inventors to predict or foresee "every conceivable and possible future embodiment of [their] invention" at the time the application is filed, as stated in *Rexnord Corp. v. Laitram Corp* (Supra) The Board's Decision has not responded to these legal authorities. The Board's Decision continually relies on applying *Genentech* in a manner which is an error of law as stated above.

**38. Section**

The Board's Decision at BD page 34 lines 10-23, commenting on legal precedent cited by Appellants states:

> Appellants rely on numerous legal authorities in support of their enablement viewpoint. For the most part, however, these authorities and Appellants' arguments regarding them are not concerned with the pivotal question of why Appellants' Specification would have led an artisan to reasonably believe that Appellants' success with the previously noted mixed transition metal oxides could be extrapolated with a reasonable expectation of success to the other materials embraced by the claims of this subsection. Nevertheless, it is important that we clarify misimpressions created by Appellants' arguments regarding certain legal authorities.

Appellants respectfully disagree that the legal authorities cited by Appellant and their arguments regarding them "would [not] have led an artisan to reasonably believe that Appellants' success with the previously noted mixed transition metal oxides could be extrapolated with a reasonable expectation of success to the other materials embraced by the claims of this subsection." Initially the Examiner never raised this issue in prosecution, in the Total Final Action or in the Examiner's Answer. Appellants responded to every argument and reason for rejection raised by the Examiner. The Board for the first time is raising this issue in the Board's Decision. Appellants should not be required to respond to this comment in a Request for Rehearing. Thus Appellants request that their Request to Reopen Prosecution be granted. To the extend that it is essential to establish enablement by showing that Appellants' Specification "would have led an artisan to reasonably believe that Appellants' success with the previously noted mixed transition metal oxides could be extrapolated with a reasonable expectation of success to the other materials embraced by the claims of this subsection," the Examiner's failure to raise this issue in prosecution or at the latest in the Final Action, means that the Final Action has not made out a prima facie case of lack of enablement Thus a prima facie case of lack of enablement is being made for the first time in the Board's Decision and Appellants'' Request to Reopen Prosecution should be granted.

Appellant disagrees that the have created misimpressions regarding certain legal authorities.

**39. Section**

The Board's Decision at BD page 34 line 24 to page 35, 3 lines from the bottom, are directed to the Board's comments on *In re Fischer,* 427 F.2d 833, 839 (CCPA 1970).

For purposes of clarification of the record Appellants note in the last paragraph at RB page 12 states:

> Applicants discovered that ceramic materials are superconductors. Their work lead and leads others to look for other species. Applicants' evidence shows that those others used Applicants teaching to determine those species. Thus following In re Fisher "It is apparent that such an inventor should be allowed to dominate the future patentable inventions of others where those inventions were based in some way on his teachings." (166 USPQ 18, 24) (**The CAFC referred to this statement as dictum** in Plant Genetic Sys. v. DeKalb Genetics Corp., 315 F.3d 1335, 1340 (Fed. Cir. 2003), 65 U.S.P.Q.2D (BNA) 1452.)

Appellants note the full citation is:

> PGS notes that Fisher also stated that "such an inventor should be allowed to dominate the future patentable inventions of others where those inventions were based in some way on his teachings." Fisher, 427 F.2d at 839. This dictum, however, only sets the context for Fisher's holding that "it is equally apparent, however, that [the inventor] must not be permitted to achieve this dominance by claims which are insufficiently supported and hence not in compliance with the first paragraph of 35 USC 112." Id.
>
> Plant Genetic Sys. v. DeKalb Genetics Corp., 315 F.3d 1335, 1340 (Fed. Cir. 2003)

Dictum is not the holding of a decision but it is persuasive authority. Since it is Appellants position that they have fully enabled their claims, this dictum applies to them.

**40. Section**

The Board's Decision from page 35, 3 lines from the bottom to page 41, line 17, applies the 8 factors provided in *In re Wands* 858 F.2d at 737 as relevant to determining whether their Specification disclosure enables the claims under consideration without undue experimentation.

BV1 page 126, lines 11-14, state in regards to the *In re Wands* eight factors:

> The Examiner has not applied these factors. And in the final rejection the Examiner has not commented on nor rebutted Applicants' analysis of the application of the In re Wands factors to the present application in Applicants' Response dated 01/28/2005 in response to Office Action dated 07/28/2004. Applicants have shown that:

BV1 page 129, lines 14-19, state in regards to the *In re Wands* eight factors:

> A conclusion of lack of enablement means that, based on the evidence regarding each of the above factors, the specification, at the time the application was filed, would not have taught one skilled in the art how to make and/or use the full scope of the claimed invention without undue experimentation. In re Wright, 999 F.2d 1557,1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993). It is the Examiner's burden to show this and the Examiner has clearly not done so.

The Examiner's Answer did not address the eight *In re Wands* factors, thus the Total Final Rejection and the Examiner's Answer did not make out a prima facie case of lack of enable of any of the rejected claim, including those for which the Board's Decision did not reverse the Examiner's rejections. For the fist time in the prosecution of this application the eight *In re Wands* factors are applied in the Board's Decision. Appellants should not be required in a Request for Rehearing to respond for the first time to an application of the eight *In re Wands* factors. In view thereof Appellants request ht their Request to Reopen Prosecution be granted so that they can properly respond to the application of these factors for the first time in prosecution.

At BD page 36, line 11-14, the first *In re Wand* Factor (1) the quantity of experimentation necessary is applied. The Board's decision states :

> There is no meaningful limit to the quantity of experimentation required by the claims in this subsection. This is because these claims define the recited high temperature superconductor with a broad scope which includes, for example, any oxide (claim 12) or any composition (claim 88).

Initially claim 12 and claim 88 are not the only claims for which the Board's Decision has not reversed the Examiner rejection. The Board has only identified two of the broadest claims. Each calim has been appealed separately and should be treated separately. That there is no meaningful limit to the number of species is not fatal to finding of enablement.

*In re Angstadt* 190 USPQ 214, 218 (CCPA 1976) applies essentially the same eight *In re Wands* factors. (See BV1page 104) BV1 paragraph bridging page 70-71 states

> According to In re Angstadt 190 USPQ 214, 218 (CCPA 1976) in an unpredictable art, §112 does not require disclosure of a test with every species covered by a claim. The CCPA states:
>
> > To require such a complete disclosure would apparently necessitate a patent application or applications with "thousands" of examples or the disclosure of "thousands" of catalysts along with information as to whether each exhibits catalytic behavior resulting in the production of hydroperoxides. More importantly, such a requirement would force an inventor seeking adequate patent protection to carry out a prohibitive number of actual experiments. <u>This would tend to discourage inventors from filing patent applications in an unpredictable area since the patent claims would have to be limited to those embodiments which are expressly disclosed. A potential infringer could readily avoid "literal" infringement of such claims by merely finding another analogous catalyst complex which could be used in "forming hydroperoxides."</u> (Emphasis Added)

Thus according to *In re Angstadt* a claim encompassing thousand of species can be enables by a small number of examples,

BV1 page 229 6Lines from the bottom to page 231. line 3 states in regards to the United States Supreme Court decision in *Minerals v. Hyde*:

> The claims found enabled are directed to "ores." The Supreme Court did not require the claims of the Minerals Patent to be limited to the ores that were recited in the patent. The claims include within their scope "ores" described in the patent, ores know by others and not described in the patent, ores not yet discovered and, moreover, would include within their scope an ore type materials that was not naturally occurring, but which could be made by man. The Supreme Court states as quoted above in the Supreme Court Minerals v. Hyde Enablement Statement "The composition of ores varies infinitely." The patent applicant was not required to describe the infinite variation of the ores in the patent to generically claim an ore and for this generic claim to be enabled for all ores. The only specific description in the Minerals Patent of an ore is at Col. 1, lines 10 – 12 which states "This invention relates to improvements in the concentration of ores, the object being to separate metalliferous matter,. graphite, and the like from gangue by means of oils, fatty acids,: or other substances which have a preferential affinity for metalliferous matter over gangue" and at Col. 2, lines 70 – 76, "The following is an example of the application of this invention to the concentration of a particular ore. An ore containing ferruginous blende, galena, and gangue consisting of quartz, rhodonite, and garnet is finely powdered and mixed with water containing a fraction of one per cent, or up to one per cent, of a mineral acid or acid salt, conveniently sulfuric acid or mine or other waters containing ferric sulfate." The reason given by the Supreme Court, as quoted above in The Supreme Court Minerals v. Hyde Enablement Statement, for why the generic claims covering an infinite number of species were enabled is "[t]he process is one for dealing with a large class of substances and the range of treatment within the terms of the claims, while leaving something to the skill of persons applying the invention, is clearly sufficiently definite to guide those skilled in the art to its successful application, as the evidence abundantly shows. This satisfies the law." That there is a large class (infinite in number) of substances within the scope of the claim that may not be specifically described, and where the specification only describes a small number of preferred embodiments, does not render the claim not enabled. The Supreme Court clearly says "leaving something to the skill of persons applying the invention is clearly sufficiently definite to guide those skilled in the art to its successful application." Moreover, there is no certainty that the claimed method in the Materials Patent would work for every ore until it was experimentally determined to work for a particular ore. This did not render the claims not enabled. It is clear that the

> Supreme Court did not find that it was necessary to know what ores the process worked for in advance since this was experimentally determinable by techniques known to persons of skill in the art following the teaching in the Minerals Patent. Thus the patent applicant of the Minerals Patent was not required to foresee (or predict in the sense used by the Examiner of the present application) all species that came within the scope of the Minerals Patent claims. The same is true of the claims under appeal herein and rejected as not enabled.

Thus a claim wherein there is a large class (infinite in number) of substances within the scope of the claim that may not be specifically described, and where the specification only describes a small number of preferred embodiments, does not render the claim not enabled.

BD page 36, line 16-19 states:

> According to Appellants, "Applicants have shown that the quantity of experimentation needed to make samples to use the invention based on the content of the disclosure in the specification is routine experimentation" (App. Br., vol. I, p. 128). This statement is inaccurate.

The Board's comment in regards to Appellants comment "This statement is inaccurate" is where the real inaccuracy is. According to *In re Angstadt*, and the United State Supreme Court in *Minerals Separation v, Hyde* a small number of species in an art such as that to which Appellants' claims are directed is sufficient to enable a claim that includes within its scope species that "varies infinitely." As a consequence this Factor supports enablement.

At BD page 37 line 1-13, the second *In re Wand* "Factor (2) the amount of direction or guidance presented:" is applied. *In re Wands* states "The test is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the

experimentation should proceed" In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988) It is clear from *In re Wands* that guidance is needed only if the experimentation in not routine. There is no evidence in the record that anything other than routine fabrication of sample by known principles is necessary to make species that come within the scope of Appellants' claims. This is analogous to the invention in *Mineral Separation v. Hyde* where a few examples were sufficient to enable a board claim containing. a large class (infinite in number) of substances. The Board's Decision makes no mention of the United State Supreme Court decision.. *Mineral Separation v. Hyde*. Why was the broad claim permitted there but not here? The Board's statement "the Specification contains no direction for making high temperature superconductors e.g., *see* claims 12 and 88) other than the mixed transition metal oxides" is inaccurate. First or all there are many more claims than 12 and 88 that remain rejected and are significantly narrower in scope than claims 12 and 88. Also all of Appellants preferred embodiment come within the scope of claims 12 and 88. Also, secondly, the are many thousands of already fabricated materials that merely have to be made by methods reported in the literature and tested by known means. The techniques are all known prior to Appellants earliest filing date. The CAFC in *Genentech* states:

> the omission of minor details does not cause a specification to fail to meet the enablement requirement. However, when there is no disclosure of any specific starting material or of any of the conditions under which a process can be carried out, undue experimentation is required; there is a failure to meet the enablement requirement that cannot be rectified by asserting that all the disclosure related to the process is within the skill of the art. It is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement. This specification provides only a starting point, a direction for further research.

Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1366 (Fed. Cir. 1997)

What the Board's Decision says is missing from Appellants teaching are minor details that are not required to be listed. None of these detail are "novel aspects" since they are known to I persons of skill in the art. The Board would require a patent applicant to write an encyclopedia of known information into a patent application to get a claim of broad scope. *Genentech* say this is not necessary.

As a consequence this Factor supports enablement.

At BD page 37 lines 14-24, the third *In re Wands* Factor (3) the presence or absence of working examples: is applied. The Board's decision states "that the Specification examples are limited to the mixed transition metal oxides discussed in subsection I. Under these circumstances, a non-enablement conclusion is supported by Factor (3)." In *Mineral Separation v. Hyde* only a small number of examples were sufficient to find enabled a claim to the genus "ore." The facts in the present application are not different. There is no evidence in the record that persons of ordinary skill in the art had or have any difficulty in making and testing species that come with in the scope of the Subsection ii claims outside of what the Board's Decision has found enabled. . Just as in *In re Wands, In re Angstadt* and *Miner Separation v. Hyde* only routine screening is required which justifies finding broad claim enables. The Board's assertions to the contrary are not based on any facts but only conclusory statements. As a consequence this Factor supports enablement.

At BD page 38 lines 1 -16, the fourth *In re Wands* Factor (4) the nature of the invention: is applied.. Appellants maintain that the invention is easily practice by persons of skill in the art. The Poole 1988 Enablement Statement is clear evidence of this. This is confirmed by the DST Affidavits. (Brief Attachment AM, AN and AO). This is comparable to the invention in

*Mineral Separation v. Hyde*. A broad claim was justified there because the invention was easily practiced.. As a consequence this Factor supports enablement.

At BD page 38 line 17 to page 39, line 2, , the fifth *In re Wands* Factor (5) the state of the prior art: is applied. The only evidence in the record is that well known methods to make species that come within the scope of Appellant's claims are needed to make and test samples that come within the scope of Appellants' claims. The Board's statement to the contrary is factual error. There is no evidence in the record that persons of ordinary skill in the art have any difficulty in making specie that come with in the scope of Appellants claims. All of the claim in Subsection III includes within their scope Appellants' specific embodiments described in their Specification. As a consequence this Factor supports enablement..

At BD page 39 line 6 – 13 to page 40,line, line 6, , the sixth *In re Wands* Factor (6) the relative skill of those in the art: is applied. The Board accepts Appellants definition of persons of skill in the art. The skill in the art of fabricating ceramic material is high. Testing these materials for superconductivity is well understood. As a consequence this Factor supports enablement..

At BD page 40, line 7-13 the seventh *In re Wands* Factor (7) - the predictability or unpredictability of the art: is applied. For the reasons given above the art of high $T_C$ superconductivity is predictable. Appellants disagree with the Board's position. As a consequence this Factor supports enablement..

At BD page 40, line 14 to page 41, line 7 the eight *In re Wands* Factor (8) the breadth of the claims: is applied. As stated above the Board's Decision only selects two claims, 12 and 88, from the many other claim

of narrower scope that remain rejected to focus on. Appellants maintain that they are entitled to a claim as broad as their discovery. which includes compounds, such as ceramics, more particularly, oxides, metal oxides, transition metal, etc. can carry a superconductive current for a $T_c > 26$ K. Finding species is merely a matter of making and testing samples. Claim sof this type were found enable in *In re Wands*, *In re Angstadt* and in *Mineral Separation v. Hyde*.for similar reasons - only routine making and testing is required.. Appellants disagree with Board's statement. As a consequence this Factor supports enablement.

Appellants disagree with the Board's statement at BD page 40, 3 lines from the button to page 41 line 6. :

> However, it is important to clarify that the record of this appeal does not support Appellants' implication that the Specification discloses their discovery with sufficient detail to enable those skilled in this art to make and use the full scope of the invention defined by the claims under consideration. As discussed above, Appellants' arguments and evidence of record have little if any value establishing that an artisan would have reasonably believed that Appellants' high temperature superconductivity success with mixed transition metal oxides could be extrapolated with a reasonable expectation of success to the other materials encompassed by the claims of this subsection. For these reasons,

This stement is an error of law since following *In re Wands*, *In re Angstadt* and in *Mineral Separation v. Hyde* as applied in Appellants' Brief and Appellant's Replies Appellants claims are enabled to their full scope.

Factor (8) evinces -enablement.

CONCLUSION

In view of Appellants arguments in Appellant's Brief, Appellants Replies and this Request for Rehearing. Appellants request the Board to reverse the rejection the claims for which the Board sustained the Examiner Rejections in the Decision on Appeal for which this Request for Rehearing has been requested.. In particular, Appellants request reconsideration of claims which remain rejected which recite that the high $T_C$ element "can be made according to known principles of ceramic science" or similar recitation. These include independent claim 522.and portions of multiply dependent claims 322 to 360, 414 to 427, 436, 453 to 465, 473 to 475, and 484 to 491 which remain rejected. Those that remain rejected are:

326/93, 94, 95
327/64
329/12-23, 110, 131, 133, 337-370
334/275, 310
337/117
338/24-26, 60-63,116, 141 -143, 187, 222-224, 278, 285, 313, 320
356/126, 127
424/283, 386, 387, 389
427/402
549/496-500, 508

In addition reconsideration is requested of the following independent claims:

- independent claims 59 which is directed to "**a ceramic like material**" and

- independent claim 374 which is directed to "**a material comprising a ceramic characteristic**"

and the following dependent claims which depend therefrom::

Dependent claim 351 depends from claim 59 and states that the **"ceramic like material" "can be made according to known principles of ceramic science."**

Dependent claim 419 depends from claim 374 and states that the "**the material comprising a ceramic characteristic**" "**can be made according to known principles of ceramic science.**"

Please charge any fee necessary to enter this paper and any previous paper to deposit account 09-0468.

Respectfully submitted,

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ATTACHMENT BN

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Applicants: Bednorz et al.

Serial No.: 08/479,810

Filed: June 7, 1995

Appeal 2009-003320

Date: Nov. 13, 2009

Docket: YO987-074BZ

Group Art Unit: 1751

Examiner: M. Kopec

For: NEW SUPERCONDUCTIVE COMPOUNDS HAVING HIGH TRANSITION TEMPERATURE, METHODS FOR THEIR USE AND PREPARATION

Commissioner for Patents

P.O. Box 1450 Alexandria,

VA 22313-1450

**AFFIDAVIT OF DENNIS NEWNS**

**UNDER 37 C.F.R. 1.132**

Sir:

I, Dennis Newns, declare that:

1. I received a B. A. degree in Chemistry form Oxford University United Kingdom in 1964 and a Ph.D. degree in Theoretical Physical Chemistry form the University of London in 1967.
2. I am a theoretical solid state scientist. My resume and curriculum vitae were attached to my prior affidavit dated April 10, 2006 (Prior Affidavit).
3. In my prior affidavit I commented on the USPTO response dated October 20,

2005 (Office Action) which at page 4 regarding the subject application cites Schuller et al "A Snapshot View of High Temperature Superconductivity 2002" (report from workshop on High Temperature Superconductivity held April 5-8, 2002 in San Diego) which the examiner states "discusses both the practical applications and theoretical mechanisms relating to superconductivity."

4. As stated in paragraph 4 of my Prior Affidavit the Examiner at page 4 of the Office Action cites page 4 of Schuller et al which states:

> "Basic research in high temperature superconductivity, because the complexity of the materials, brings together expertise from materials scientists, physicists and chemists, experimentalists and theorists... It is important to realize that this field is based on complex materials and because of this materials science issues are crucial. Microstructures, crystallinity, phase variations, nonequilibrium phases, and overall structural issues play a crucial role and can strongly affect the physical properties of the materials. Moreover, it seems that to date there are no clear-cut directions for searches for new superconducting phases, as shown by the serendipitous discovery of superconductivity in $MgB_2$. Thus studies in which the nature of chemical bonding and how this arises in existing superconductors may prove to be fruitful. Of course, "enlightened" empirical searches either guided by chemical and materials intuition or systematic searches using well-defined strategies may prove to be fruitful. It is interesting to note that while empirical searches in the oxides gave rise to many superconducting systems, similar (probable?) searches after the discovery of superconductivity in $MgB_2$ have not uncovered any new superconductors."

5. As stated in paragraph 5 of my Prior Affidavit the Examiner at pages 4 -5 of the Office Action cites pages 5- 6 of Schuller et al which state:

> "The theory of high temperature superconductivity has proven to be elusive to date. This is probably as much caused by the fact that in these complex materials it is very hard to establish uniquely even the experimental phenomenology, as well as by the evolution of many competing models, which seem to address only particular aspects of the problem. The Indian story of the blind men trying to characterize the main properties of an elephant by touching various parts of its body seems to be particularly relevant. It is not even clear whether there is a single theory of superconductivity or whether various mechanisms are possible. Thus it is impossible to summarize, or even give a complete general overview of all theories of

superconductivity and because of this, this report will be very limited in its theoretical scope."

5. As stated in paragraph 6 of my Prior Affidavit the Examiner at page 5 of the Office Action cites page 7 of Schuller et al which states:

> "Thus far, the existence of, a totally new superconductor has proven impossible to predict from first principles. Therefore their discovery has been based largely on empirical approaches, intuition, and. even serendipity. This unpredictability is at the root of the excitement that the condensed matter community displays at the discovery of a new material that is superconducting at high temperature."

7. My Prior Affidavit was submitted to clarify what is meant by predictability in theoretical solid state science and to comment on the passages quoted above in paragraphs 4, 5 and 6.

8. I am submitting this affidavit to comment on certain remarks made in the Decision on Appeal of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office (Board's Decision) dated 09/17/2009.

9. Apparently motivated by my Prior Affidavit and the arguments made by the patent applicants base on my Prior Affidavit the Board's Decision makes the following comments at page 10 in regards to a paragraph from page 7 of the Schuller article (quoted above in paragraph 6):

> As support for the finding of unpredictability in the high temperature superconductor art, the Examiner relies on the Schuller article "A Snapshot View of High-Temperature Superconductivity 2002", which discloses:
>
> > Thus far, the existence of a totally new superconductor has proven impossible to predict from first principles. Therefore, their discovery has been based on largely on empirical approaches, intuition, and even serendipity. This unpredictability is at the root of the excitement that the condensed matter community displays at the discovery of a new material that is superconducting at high temperature.(Schuller 7).

10. Boards' Decision page 26, lines 15-19, states

> Appellants urge that their predictability position is

> supported by Schuller's reference to new superconductor discoveries as based largely on empirical approaches, intuition, and serendipity since these bases are typically used by scientists during the discovery process as evidenced by the Newns affidavit *(id.)*. However, Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists.

11. .The first few sentences of paragraph 7 of my Prior Affidavit states:

> I am submitting this declaration to clarify what is meant by predictability in theoretical solid state science. A theory of a solid is based on approximate mathematical formalisms to represent these interactions. A theoretical solid state scientist makes an assessment using physical intuition, mathematical estimation and experimental results as a guide to focus on features of the complex set of interactions that this assessment suggests are dominate [sic., dominant] in their effect on the physical phenomena for which the theorist is attempting to develop a theory. This process results in what is often referred to as mathematical formalism. This formalism is then applied to specific examples to determine whether the formalism produces computed results that agree with measured experimental results. This process can be considered a "theoretical experiment."

12. The last few sentences of paragraph 9 of my Prior Affidavit state referring as an example to a well understood theory in semiconductors :

> Moreover, that a theoretical computation is a "theoretical experiment" in the conceptual sense [is] not different than a physical experiment. The theorist starting out on a computation, just as an experimentalist staring out on an experiment, has an intuitive feeling that, but does not know whether, the material studied will in fact be a semiconductor. As stated above solid state scientists, both theoretical and experimental, are initially guided by physical intuition based on prior experimental and theoretical work. Experiment and theory complement each other, at times one is ahead of the other in an understanding of a problem, but which one is ahead changes over time as an understanding of the physical phenomena develops.

These comments equally apple to high $T_c$ superconductivity.

13. It is my position that the Board's Decision as quoted in paragraphs 9 and 10

above is inconsistent with what I stated in my Prior Affidavit as indicated by the representative examples from my Prior Affidavit quoted in paragraphs 11 and 12 above. I refer the complete text of my Prior Affidavit for all the details.

14. I disagree with the Board's Decision quoted in paragraph 10 above where it states "Appellants have not established their proposition that predictability is indicated by the use of empirical approaches, intuition, and serendipity in the research and discovery methodology of scientists."

15. "Physical intuition" to an experimental scientist is developed from the experimental techniques and apparatus they use and the data that they measure. This is their "empirical approaches."

16. "Physical intuition" to a theoretical scientist is developed from the mathematical and calculation techniques they use (which includes numerical calculations on computers), the equations they develop and the data that they calculate. This is their empirical approaches. Where I use empirical here as I use the term "theoretical experiment" in my Prior Affidavit.

17. Both experimental and theoretical scientists are primarily guided by this developed "physical intuition."

18. A theoretical scientist does not make random calculations and an experimental scientist does not make random experiments. Such a random approach would not result in useful results.

19. When a theoretical scientist chooses to go into a particular theoretical direction or when an experimental scientist chooses to go in a particular experimental direction, that direction is guided by "physical intuition" with a reasonable expectation of success in carrying out the experiment or calculation and arriving at a measured or calculated result

20. Both theoretical and experimental scientists are primarily guided by "physical intuition" which is developed by educational training and the theoretical work or experimental work that they do.

21. When a theoretical or experimental result is achieved, that result is systematically explored to develop a fuller theoretical or experimental understanding which further develops or enhances the scientist "physical intuition."

22. Systematic exploration to a theoretical scientist may for example include varying certain parameters used in a calculation, modifying approximate equations used in the calculation or modifying a numerical computational approach. All of this is done with a reasonable expectation of getting successfully calculated results.

23. Systematic exploration to an experimental scientist may for example include varying certain experimental conditions, e.g. temperature, time, pressure, mix of constitutes, etc. used in an experiment in fabricating samples, modifying measurement apparatus to better measure the physical parameters, and measuring more and different physical parameters to get a fuller set of measured data . All of this done with a reasonable expectation of getting successfully fabricated samples and measured results.

24. I turn now to Schuller's use of the term "serendipity."

25. Both experimental and theoretical scientist uses the term "serendipity." But, an experimental or theoretical observation that they make which they refer to as "serendipitous" was not a random calculation, a random fabrication of a sample or a random measurement of a sample. Both the theoretical scientist and the experimental scientist set out based on physical intuition , as I have described it above based on "physical intuition" with a reasonable expectation of success that they would successfully make a sample, measure a sample, or perform a calculation. No reasonable scientist of ordinary scientific skill in their scientific discipline would set out on an experiment, measurement or calculation without a reasonable expectation of success. A reasonable scientist of ordinary scientific skill in a scientific discipline does not perform random and arbitrary experiments, calculations and measurements.

26. The term "serendipity" to a reasonable scientist of ordinary scientific skill in a scientific discipline means that they recognize that based on their "physical " intuition" they have chosen the correct direction out of a possibility of many directions that may not have yielded as successful a result.

27. I understand Schuller's use of the term "serendipity or serendipitous" in this context.

28. Thus when Schuller in the section for the Schuller article quoted in paragraph

4 above refers to "the serendipitous discovery of superconductivity in $MgB_2$," he is using the term "serendipitous" in this context and with this meaning,

29. I note that Schuller is not an author on the paper first reporting superconductivity in $MgB_2$. The Schuller article at page 7, first paragraph, refers to reference 8 for the "discovery in 2001[8] of $MgB_2$" being a superconductor See reference 8 at page 39 of the Schuller article. Schuller is not listed as an author.

30. The Schuller articles characterization of the discovery of superconductivity in $MgB_2$ as "serendipitous" is Schuller's statement and not that of the discoverers , i.e. the authors of the article.

31. The authors of the article reporting superconductivity in $MgB_2$ may consider it a result of their intuition and systematic study based on the work of the inventors, Bernorz and Mueller, of the above identified patent application.

32. As I stated in paragraph 19 of my Prior Affidavit "Schuler refers the discovery of $MgB_2$ citing the paper of Nagamatsu et al. Nature Vol. 410, March 2001 in which the $MgB_2$ is reported to have a Tc of 39 K, a layered graphite crystal structure and made from powders using known ceramic processing methods. $MgB_2$ has a substantially simpler structure than the first samples reported on by Bednorz and Muller.""

33. I also note that that $MgB_2$ was made at least as early as 1954, more than 30 years prior to Bednorz and Mueller's discovery of High $T_C$ superconductivity, as reported in the following article:

> **The Preparation and Structure of Magnesium Boride, $MgB_2$**
> Morton E. Jones and Richard E. Marsh
> J. Am. Chem. Soc.; **1954;** 76(5) pp 1434 - 1436;

34. I also note that $MgB_2$ is layered, which is one of the properties that the Bednorz and Mueller patent application says is a property of the materials that they discovered to be high $T_C$ superconductors.

35. I also note that Mg and B are elements that are constituents of materials know to be superconductors prior to the discovery of Bernorz and Mueller.

36. Thus to the authors of the article reporting superconductivity in $MgB_2$ it may not have been "serendipitous" that a previously made material, that is layered

and made of elements known to have been constituents of know superconductors, were high $T_c$ superconductors, but that their result was consistent with their intuition.

37. I will not repeat here everything that I said in my Prior Affidavit, but refer to it for the details.

38. In closing I note that the concept of a "theory" as used in solid state science or other sciences in the broadest sense refers to the "physical intuition" that scientist has about a physical phenomenon based on which the scientist forms a "phenomenological understanding" which may not be amenable to being put into an easily used form for straightforward calculation. This "phenomenological" understanding is part of the "physical intuition" that guides both the experimental and theoretical scientist to pursue a particular direction in their research. This is to be contrasted with the more specialized meaning of the term "theory" which I will refer to as a "formal theory" which means formal analytical expressions in mathematical form based on first principles as I described in my Prior Affidavit. Experimental scientists generally do not develop or work on "formal theories" since this requires extensive training in the mathematical formalisms. Theoretical scientists generally do not perform physical experimentation since this requires extensive training in the experimental techniques. As stated above both experimental and theoretical scientists use "physical intuition" and develop and use their own form of "phenomenological theory" which is their physical understanding of a phenomenon which guides them and others working in the field in further research and development. The inventors, Bednorz and Mueller, described their physical understanding of their discovery in their publications and patent application and others used it in looking for other high $T_c$ superconductors.

27. I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both,

under Section 1001 of Title 18 of the United States Code and that such willful false statements made jeopardize the validity of the application or patent issued thereon.

By:

Dennis Newns

Sworn to before me this day of Nov. 13, 2009

Daniel P. Morris

DANIEL P. MORRIS
NOTARY PUBLIC, State of New York
No. 4838676
Qualified in Westchester County
Commission Expires March 16, 2011

ATTACHMENT BO

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of
Applicants: Bednorzetal.
Serial No.: 08/479,810
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Commissioner for Patents P.O. Box
1450 Alexandria, VA 22313-1450

**DECLARATION OF GEORG BEDNORZ UNDER 37 C.F.R. 1.132**

Sir:

I, J.Georg Bednorz, declare that:

1. I am a coinventor of the referenced application.

2. I received a M. S. Degree in Mineralogy/Crystallography (1976) from the University of Muenster in Germany and a Ph.D. degree in Natural Science (1982) from the Swiss Federal Institute of Technology (ETH) in Zuerich - Switzerland.

3. I previously submitted a declaration date February 2, 2006. (Prior Declaration)

4. In my Prior Declaration I responded to the USPTO response dated October 20, 2005 at page 7 which cites the following webpage

http://www.nobelchannel.com/learningstudio/introduction.sps?id=295&eid==0

Which states

> It is worth noting that there is no accepted theory to explain the high-temperature behavior of this type of compound. The BCS theory, which has proven to be a useful tool in understanding lower-temperature materials, does not adequately explain how the Cooper pairs in the new compounds hold together at such high temperatures. When Bednorz was asked how high-temperature superconductivity works, he replied, "If I could tell you, many of the theorists working on the problem would be very surprised."

5. I am submitting this affidavit to comment on certain remarks made in the Decision on Appeal of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office (Board's Decision) dated 09/17/2009.

6. The Board's Decision states at page 27, lines 3-10, in regards to my Prior Affidavit:

> With respect to the Examiner's reliance on the "Exploring

> Superconductivity" article as evidencing predictability, Appellants attempt to undermine this evidence via the Bednorz affidavit of record (App. Br., vol. 5, Evidence Appendix, Attachment AQ) which addresses the Bednorz quotation in this article (App. Br., vol. 1, p. 209). Significantly, the Bednorz affidavit fails to address the article disclosure which states that "there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound" ("Exploring Superconductivity", last para.). The absence of such a theory supports the Examiner's unpredictability position.

7. I respectfully disagree that I have attempted to "undermine" what I was reported to have said in the Exploring Superconductivity Article.

8. In the last paragraph of my Prior Declaration I declared that what I stated therein was a true statement. I reaffirm that here.

9. In my Prior Declaration I explain the meaning of the statement attributed to me "If I could tell you, many of the theorists working on the problem would be very surprised" in response to a question from the interviewer about the mechanism of High $T_C$ superconductivity.

10. It appears from the comment in the Board's Decision quoted in paragraph 6 above that it is not clear what the distinction is between an experimental scientist and a theoretical scientist is and how they think about the research work that they do.

11. The statement attributed to me in the Exploring Superconductivity Article was to my recollection made between October 1987 and December 10 1987. I know it was before December 10, 1987 since that is when the Nobel Prize Award ceremony took place. This was shortly after my co-inventor, Alex Mueller, and I revealed our discovery.

12. Since, as stated in my Prior Declaration, I am an experimental scientist, I would not have stopped my experimental work to work on developing a formal mathematical theory. To do so would have been a professional mistake. It would have required a substantial amount of in mathematical techniques that existing theoretical scientist were expert in. Moreover, by continuing my experimental work I was able to make further contributions to my experimental work.

13. I disagree with the Board's Decision quoted in paragraph 6 above where it states "[s]ignificantly, the Bednorz affidavit fails to address the article disclosure which states that 'there is no accepted theory to explain the high-temperature

[superconductivity] behavior of this type of compound' ('Exploring Superconductivity', last para.). The absence of such a theory supports the Examiner's unpredictability position."

14. I t is my position that the statement in the Exploring Superconductivity Article ""there is no accepted theory to explain the high-temperature [superconductivity] behavior of this type of compound"" as quoted in the Board's Decision is referring to a "formal mathematical theory."

15. I expressed my physical understanding of the phenomenon that I observed in my initial papers and in my patent application.

16. Both experimental and theoretical scientist work by using "physical intuition".

17. "Physical intuition" to an experimental scientist is developed from the experimental techniques and apparatus they use and the data that they measure. This is their "empirical approaches."

18. "Physical intuition" to a theoretical scientist is developed from the mathematical and calculation techniques they use (which includes numerical calculations on computers), the equations they develop and the data that they calculate. This is their empirical approaches. .

19. Both experimental and theoretical scientists are primarily guided by this developed "physical intuition."

20. A theoretical scientist does not make random calculations and an experimental scientist does not make random experiments. Such a random approach would not result in useful results.

21. When a theoretical scientist chooses to go into a particular theoretical direction or when an experimental scientist chooses to go in a particular experimental direction, that direction is guided by "physical intuition" with a reasonable expectation of success in carrying out the experiment or calculation and arriving at a measured or calculated result

22. Both theoretical and experimental scientists are primarily guided by "physical intuition" which is developed by educational training and the theoretical work or experimental work that they do.

23. When a theoretical or experimental result is achieved, that result is

systematically explored to develop a fuller theoretical or experimental understanding which further develops or enhances the scientist "physical intuition."

24. Systematic exploration to a theoretical scientist may for example, include varying certain parameters used in a calculation, modifying approximate equations used in the calculation or modifying a numerical computational approach. All of this is done with a reasonable expectation of getting successfully calculated results.

25. Systematic exploration to an experimental scientist may for example include varying certain experimental conditions, e.g. temperature, time, pressure, mix of constitutes, etc. used in an experiment in fabricating samples, modifying measurement apparatus to better measure the physical parameters, and measuring more and different physical parameters to get a fuller set of measured data . All of this done with a reasonable expectation of getting successfully fabricated samples and measured results.

26. In closing I note that the concept of a "theory" as used in solid state science or other sciences in the broadest sense refers to the "physical intuition" that scientist has about a physical phenomenon based on which the scientist forms a "phenomenological understanding" which may not be amenable to being put into an easily used form for straightforward calculation. This "phenomenological" understanding is part of the"physical intuition" that guides both the experimental and theoretical scientist to pursue a particular direction in their research. This is to be contrasted with the more specialized meaning of the term "theory" which I will refer to as a "formal theory" which means formal analytical expressions in mathematical form based on first principles. Experimental scientists generally do not develop or work on "formal theories" since this requires extensive training in the mathematical formalisms. Theoretical scientists generally do not perform physical experimentation since this requires extensive training in the experimental techniques. As stated above both experimental and theoretical scientists use "physical intuition" and develop and use their own form of "phenomenological theory" which is their physical understanding of a phenomenon which guides them and others working in the field in further research and development. My co-inventor, Alex Mueller, and I described our physical understanding of our discovery in our publications and patent application

used it as a guide in looking for other high $T_c$ superconductors.

27. I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements made jeopardize the validity of the application or patent issued thereon.

Date 11/13/2009

J. Georg Bednorz